DIGITAL A/V SURROUND RECEIVER

MX980/22S

FR984/00S

Service
Service
Service

Service Manual

For repair information please refer to Service Manual of FR965/00 & FR966/00S
(servicecode number = 3104 215 50070)

FR984/00S & MX980/22S is equal to FR966/00S except the following:

Miscellaneous:

3104 219 04460	REMOTE CONTROL
9965 000 11845	FRONT SPEAKER SILVER MX980FS
9965 000 11846	GRILL ASSY FRONT/REAR SPEAKER
9965 000 11847	CENTER SPEAKER SILVER MX980CS
9965 000 11848	GRILL ASSY CENTER SPEAKERK
9965 000 11849	REAR SPEAKER SILVER MX980RS
9965 000 11844	KEYHOLE BRACKET , MOUNTING

Electrical:

Led 6401,6421 are deleted
Led 6407,6408,6409,6410,6412,6413,6415,6416,6417,6418 red colour led
is changed into orange colour led code number : 4822 130 11589

uP 7415 changed into TMP87CS71F-MX970 code number : 3139 110 53181

Item 1301 changed into 1304 code number : 4822 265 11607
Item 2371 changed into 2317 4n7 code number : 5322 126 10223
Item 2372 changed into 2322 100p code number : 5322 122 32531
Item 2373 changed into 2328 4n7 code number : 5322 126 10223
Item 2374 changed into 2331 100p code number : 5322 122 32531
Item 2375 changed into 2335 4n7 code number : 5322 126 10223
Item 2376 changed into 2339 100p code number : 5322 122 32531

Mainstrafo 5001 changed code number : 3104 218 31020
Mains Outled 1053 are deleted

Copyright 2002 Philips Consumer Electronics B.V. Eindhoven, The Netherlands
All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, or otherwise without the prior permission of Philips.

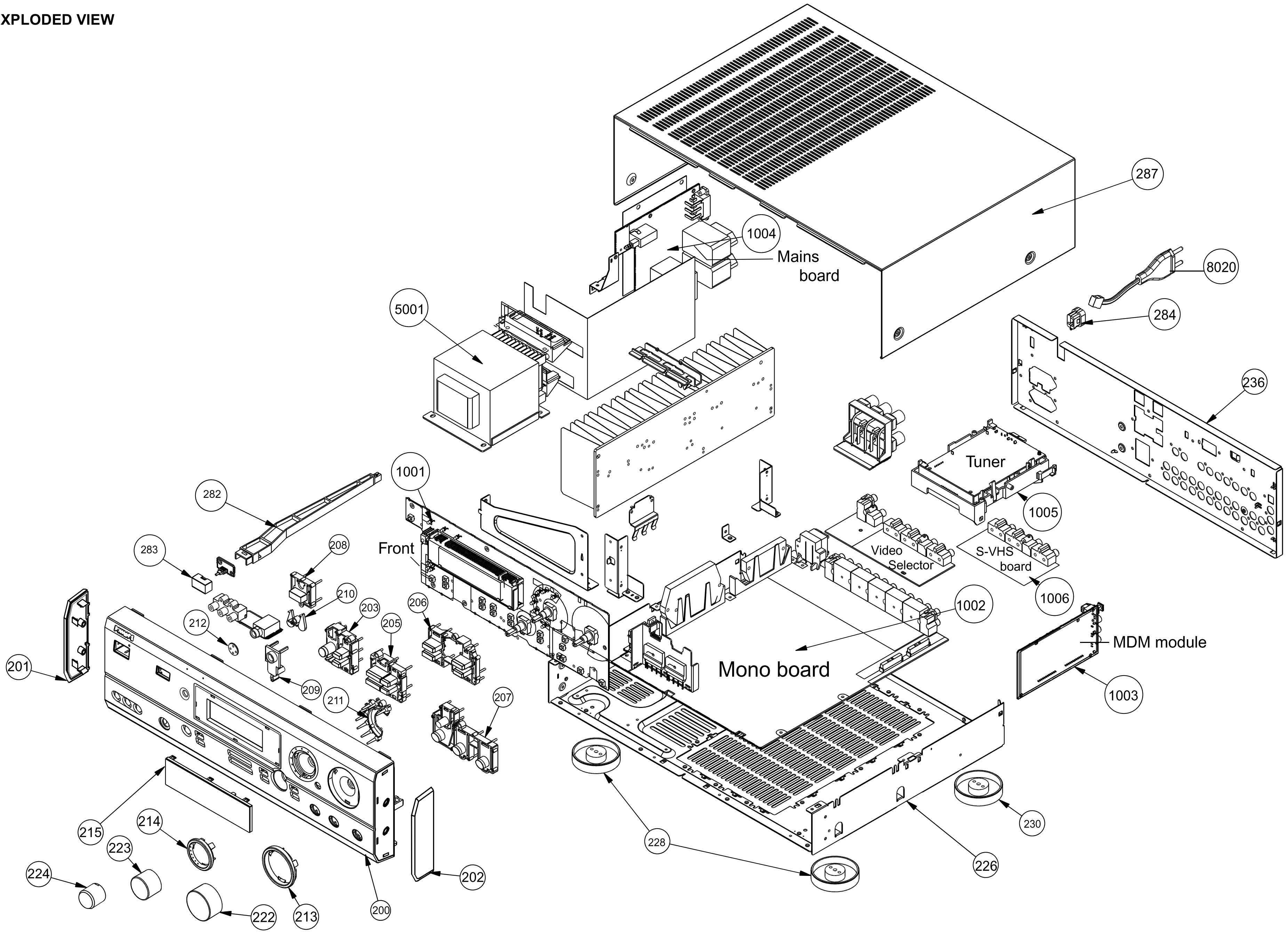
Published by MD 0205 Service Audio Printed in the Netherlands Subject to modification 3104 215 50190

PHILIPS

Mechanical: the following items are changed into:

Item	Code number	Description
200	3104 217 53330	FRONT CABINET ASSY FR984
201	3141 017 74420	CAP END LEFT ASSY
202	3141 017 74430	CAP END RIGHT ASSY
203	3141 017 74440	BUTTON ASSY SURROUND
205	3141 017 74450	BUTTON ASSY TUNER
206	3141 017 74460	BUTTON ASSY MENU
207	3141 017 74600	BUTTON ASSY BASS
208	3141 017 74480	BUTTONS EASY LINK ASSY
209	3141 017 75200	RING SURROUND ASSY
210	3141 014 24200	LIGHT GUIDE VIRTUAL/HALL
211	3141 014 24210	LIGHT GUIDE SELECTOR
212	3141 014 24290	LENS IR
213	3141 017 74490	RING KNOB VOLUME ASSY
214	3141 017 74500	RING KNOB SOURCE SEL.
215	3141 017 74350	WINDOW DISPLAY ASSY
222	3141 017 74520	KNOB VOLUME ASSY
223	3141 017 74530	KNOB SOURCE SEL. ASSY
224	3141 017 74540	KNOB MENU NAV ASSY
228	3139 247 50570	LEG SILVER
230	3139 247 50560	LEG BLACK
282	4822 535 10638	POWER ROD
283	3141 017 74550	POWER CAP ASSY

EXPLODED VIEW

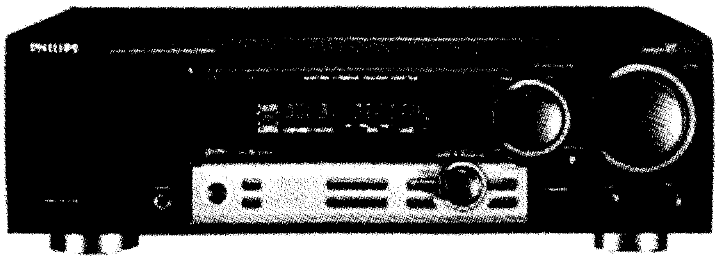

287
1004
Mains board
8020
5001
284
236
Tuner
1001
282
1005
208
Front
283
Video Selector
S-VHS board
210
1002
1006
203
206
212
205
MDM module
Mono board
201
209
207
211
1003
215
214
223
228
230
226
224
202
222
213
200
SCALE 0.250

DIGITALE A/V SURROUND RECEIVER

FR965/00

FR966/00S

Service
Service
Service



Service Manual

DOLBY
DIGITAL

TABLE OF CONTENTS

Page

Location Boards / System info 1-2
Technical Specification 1-3
Service Tool / Measurement setup / Safety 1-4
Warning / Handling Chip components 1-5
Abbreviations 1-6
Instruction for Use 2
Dismantling hints / Service positions 3-1
Dismantling hints MDM Module 3-2
Wiring diagram 3-3
Block diagram 4
Service Test program 5
Front Board 6
Tuner 95 diagram 7A
Multi-Channel Decoding Module 8
Mains Board 9
Mono Board 10
Exploded view 11
Exploded view partslist 12
Partslist Mono Board 13

Safety regulations require that the set be restored to its original condition and that parts which are indentical with those specified be used.

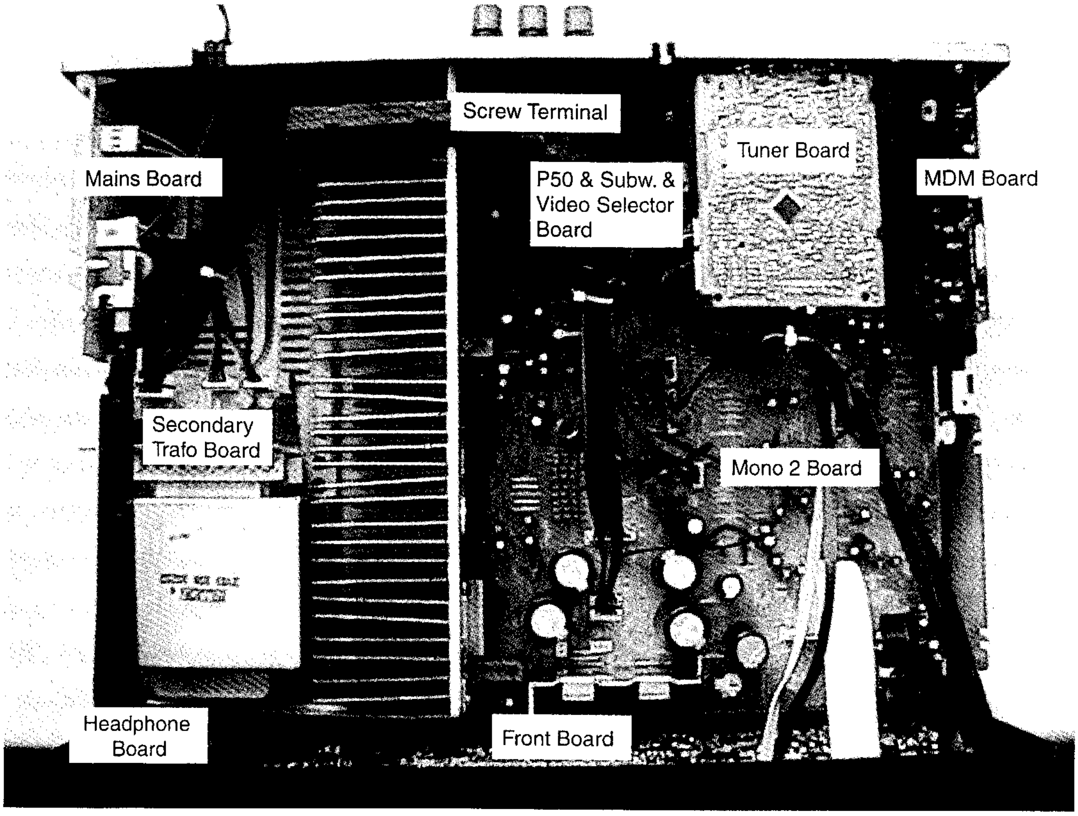
Copyright 1995 Philips Consumer Electronics B.V. Eindhoven, The Netherlands
All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, or otherwise without the prior permission of Philips.

Published by MD 0019 Service Audio Printed in the Netherlands Subject to modification 3104 215 50070

PCS 105 750

PHILIPS

LOCATION OF PRINTED CIRCUIT BOARDS


Screw Terminal
Tuner Board
Mains Board
P50 & Subw. & Video Selector Board
MDM Board
Secondary Trafo Board
Mono 2 Board
Headphone Board
Front Board

VERSION VARIATIONS

Features & Board in used / Type & Versions	FR965 = FR966 except colour	
	FR965/00	FR966/00S
Front colour	Black	Silver

SPECIFICATION FR965/00

General

Mains voltage : 230V

Mains frequency : 50Hz

Power concumption : ≤ 2W at stby
Dimension. wxhxd : 435x138x350 mm
Remote control : Multibrand/Universal

Amplifier

Output power
Stereo mode (L+R) :2x60W DIN
(1kHz, 0,7%THD, 6Ω)
Surround mode
L+R : 2x60W (1kHz, 0,7%THD, 6Ω)
Center : 60W (1kHz, 0,7%THD, 6Ω)
Surround Left + Right : 2x60W (1kHz, 0,7%THD, 6Ω)

Distortion (5W)
1kHz : ≤ 0,05%
40Hz -20kHz : ≤ 0,2%

Headphone : 6,3mm stereo jack with switch
Output level : 3V EMF, 60Ω

Crosstalk between source - 1kHz : ≤ -65dB
(1W) 250Hz – 10kHz : ≤ -60dB

Crosstalk between channels -1kHz : ≤ -55dB
(1W) 250Hz – 10kHz : ≤ -50dB

Frequency response : ≤ 10Hz – ≥ 30kHz (-1dB)

Power stage protection : Shortcircuit
: DC (Vout ≥ 10V) for ±1sec
Temperature : Transformer (≥140° Celcius)
: Heatsink (≥ 140° Celcius)

Audio Selector

Input sensitivity
Phono : 5mV impedance 47kΩ/220pf
CD : 250mV impedance ≥ 47kΩ
CDR/TAPE : 250mV impedance ≥ 47kΩ
VCR : 250mV impedance ≥ 47kΩ
TV : 250mV impedance ≥ 47kΩ
SAT : 250mV impedance ≥ 47kΩ
6CH/DVD : 250mV impedance ≥ 47kΩ
Output level
CDR/TAPE : 250mV impedance ≤ 1kΩ
VCR : 250mV impedance ≤ 1kΩ
Output level (variable)
Subwoofer pre-out : 800mV impedance ≤ 1kΩ
Center pre-out : 800mV impedance ≤ 1kΩ

Digital Selector

Input : 2 x cinch
: 1 x optical
Output : 1 x cinch

Video Selector CVBS

Input sensitivity
DVD/VCR/TV : 1 Vpp impedance 75Ω
Output level
Monitor/VCR : 1 Vpp impedance 75Ω
Frequency response : ≤ 50Hz → ≥ 6MHz

Tone controle

Loudness
(volume ≤ -20dB Ref: 1kHz=0dB) : 100Hz +6 dB
: 10kHz +2,5 dB
Tone control (Ref: 1kHz=0dB)
: Bass 100Hz -9dB →+9dB
: Treble 10kHz -9dB →+9dB

Multi Channel Decoder - MDM2000

MPEG5.1 / MPEG 7.1 (7.1 downmix to 5.1)
Dolby Digital (AC-3)
Digital Theater Systems (DTS)
Linear PCM (up to 96kHz, 24 bits resolution)
Automatic audio/data type detection (AC-3,dts,MPEG-2,PCM)
Dolby Pro Logic
MPEG-2 dual mono channel selection I/II
Virtual Dolby Surround (422/423)
Virtual MPEG Digital (522/523)
Virtual Dolby Digital (522/523)
Virtual DTS Surround (522/523)
Multi - Front / Multi - rear / Natural Surround
Digital Bass Management
Parallel Stereo Downmix
Four Stereo (224)
Volume Control
Noise Generator (test tone)
Surround mode selector
Delay Center and Surround Left , Surround Right

Tuner- (Tuner95)

RDS : Only in /00
FM
Tuning range : 87.5 – 108MHz
Grid : 50kHz
IF frequency : 10.7MHz ±25kHz
Aerial input : 75 Ω coaxial
Sensitivity at 26dB S/N : ≤ 2µv
Selectivity at 300kHz : ≥ 55dB
Image rejection : ≥ 100dB
Distortion at RF=1mV,dev.75kHz : ≤ 0,8%
-3dB Limiting point : ≤ 2µV
Crosstalk at RF=1mV,dev.40kHz : ≥35dB

MW
Tuning range : 531 - 1602kHz
Grid : 9kHz
IF frequency : 450kHz ±1kHz
Aerial input : Frame aerial
Sensitivity at 26dB S/N : ≤ 1,5mV/m
Selectivity at 9kHz : ≥ 23dB
IF rejection : ≥ 50dB
Image rejection : ≥ 33dB
Distortion at RF=50mV,m=80% : ≤ 3%

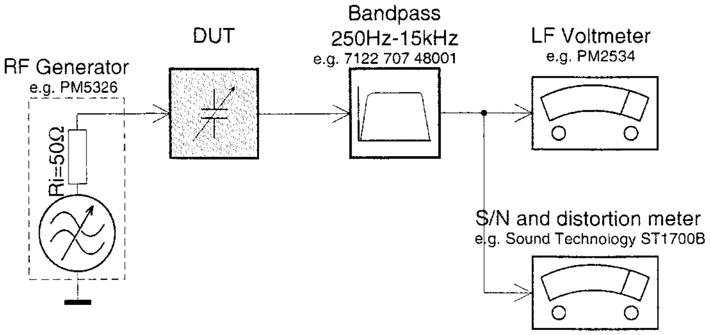
LW only in /00
Tuning range : 153 - 279kHz
Grid : 3kHz
IF frequency : 450kHz ±1 kHz
Aerial input : Frame aerial
Sensitivity at 26dB S/N : ≤ 2,8mV/m
Selectivity at 9kHz : ≥ 26dB
IF rejection : ≥ 100dB
Image rejection : ≥ 45dB
Distortion at RF=50mV,m=80% : ≤ 3%dB

SERVICE TOOL

Audio Signals Test Disc 1 .... 4822 397 30184

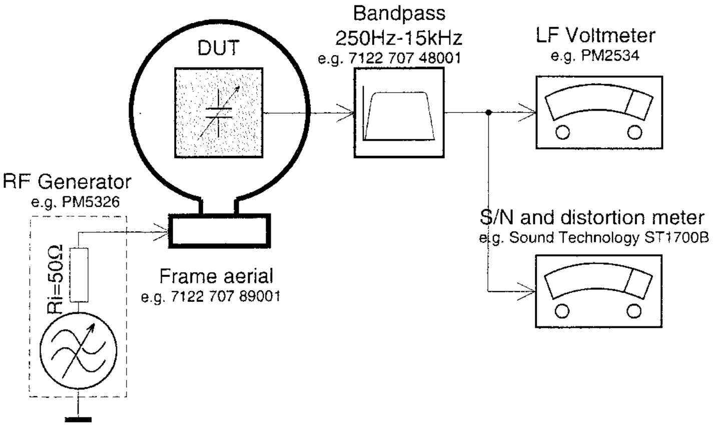
MEASUREMENT SETUP

Tuner FM


Bandpass
250Hz-15kHz
e.g. 7122 707 48001
DUT
LF Voltmeter
e.g. PM2534
RF Generator
e.g. PM5326
Ri=50Ω
S/N and distortion meter
e.g. Sound Technology ST1700B

Use a bandpass filter to eliminate hum (50Hz, 100Hz) and disturbance from the pilottone (19kHz, 38kHz).

Tuner AM (MW,LW)


Bandpass
250Hz-15kHz
e.g. 7122 707 48001
DUT
LF Voltmeter
e.g. PM2534
RF Generator
e.g. PM5326
Ri=50Ω
Frame aerial
e.g. 7122 707 89001
S/N and distortion meter
e.g. Sound Technology ST1700B

To avoid atmospheric interference all AM-measurements have to be carried out in a Faraday´s cage.
Use a bandpass filter (or at least a high pass filter with 250Hz) to eliminate hum (50Hz, 100Hz).

SAFETY

Ⓖⓑ
Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.
Safety components are marked by the symbol ⚠

Ⓕ
Les normes de sécurité exigent que l'appareil soit remis à l'état d'origine et que soient utilisées les pièces de rechange identiques à celles spécifiées.
Les composants de sécurité sont marqués ⚠

SAFETY

Ⓓ
Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Originalzustand des Gerätes darf nicht verändert werden. Für Reparaturen sind Originalersatzteile zu verwenden.
Sicherheitsbauteile sind durch das Symbol ⚠ markiert.

Ⓝⓛ
Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast.
De Veiligheidsonderdelen zijn aangeduid met het symbool ⚠

Ⓘ
Le norme di sicurezza estigono che l'apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambiago identici a quelli specificati.
Componenty di sicurezza sono marcati con ⚠

WARNING

ESD

(GB) WARNING

All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wristband with resistance. Keep components and tools at this potential.

(F) ATTENTION

Tous les IC et beaucoup d´autres semi-conducteurs sont sensibles aux décharges statiques (ESD). Leur longévite pourrait être considérablement écourtée par le fait qu´aucune précaution nést prise à leur manipulation.
Lors de réparations, s´assurer de bien être relié au même potentiel que la masse de l´appareil et enfileer le bracelet serti d´une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l´on utilise soient également à ce potentiel.

(D) WARNUNG

Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
Unsorgfältige Behandlung im Reparaturfall kann die Lebensdauer drastisch reduzieren.
Sorgen Sie dafür, daß sie im Reparaturfall über ein Pulsarmband mit Widerstand mit dem Massepotential des Gerätes verbunden sind.
Halten Sie Bauteile und Hilfsmittel ebenfalls auf diesem Potential.

(NL) WAARSCHUWING

Alle IC´s en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen. Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

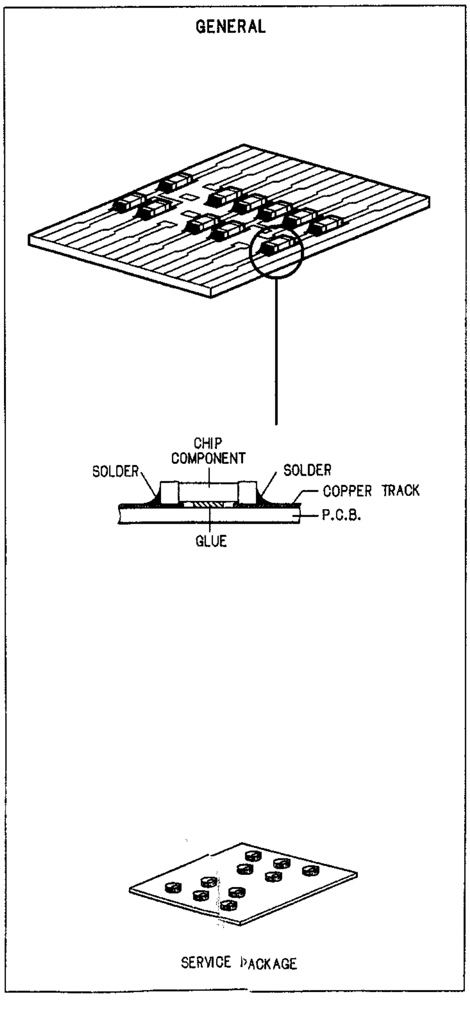
(I) AVVERTIMENTO

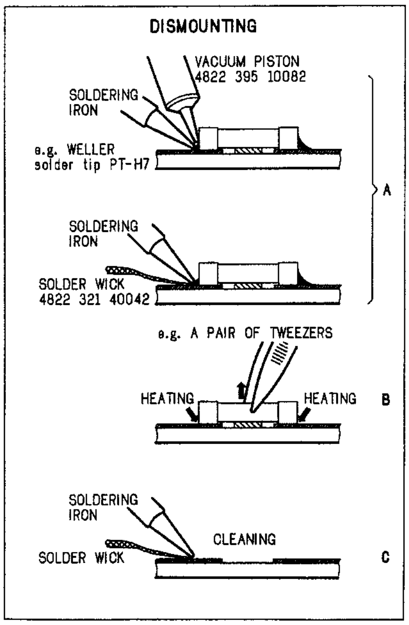
Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta in caso di non osservazione della più grande cauzione alla loro manipolazione. Durante le riparationi occorre quindi essere collegato allo stesso potenziale che quello della massa delápparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

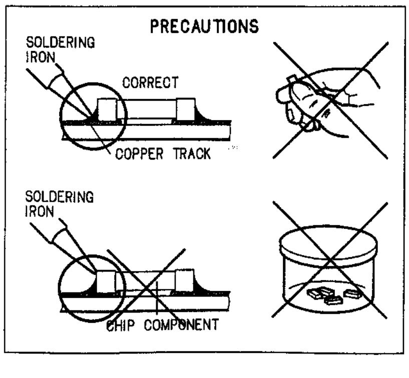
(GB) AVAILABLE ESD PROTECTION EQUIPMENT :

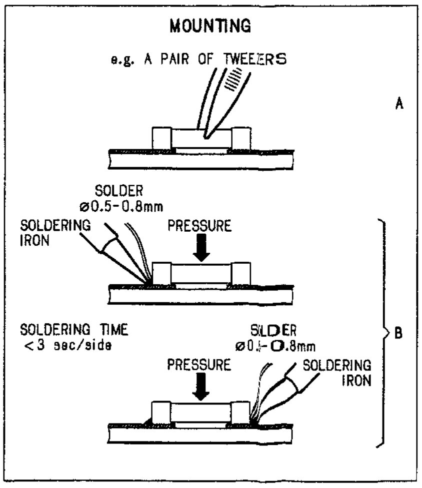
anti-static table mat	large 1200x650x1.25mm	4822 466 10953
	small 600x650x1.25mm	4822 466 10958
anti-static wristband		4822 395 10223
connection box (3 press stud connections, 1M)		4822 320 11307
extendible cable (2m, 2M , to connect wristband to connection box)		4822 320 11305
connecting cable (3m, 2M , to connect table mat to connection box)		4822 320 11306
earth cable (1M , to connect any product to mat or to connection box)		4822 320 11308
KIT ESD3 (combining all 6 prior products - small table mat)		4822 310 10671
wristband tester		4822 344 13999

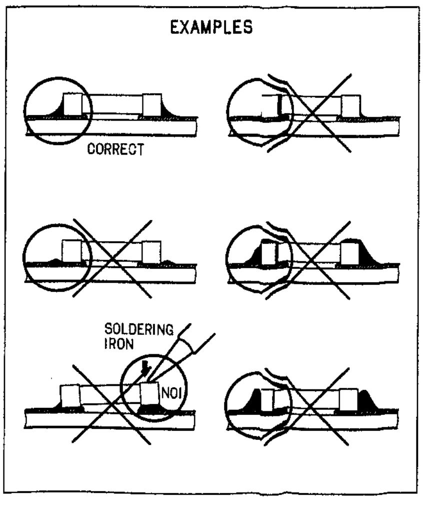
HANDLING CHIP COMPONENTS


GENERAL
CHIP COMPONENT
SOLDER
SOLDER
COPPER TRACK
P.C.B.
GLUE
SERVICE PACKAGE


DISMOUNTING
VACUUM PISTON
4822 395 10082
SOLDERING IRON
e.g. WELLER solder tip PT-H7
A
SOLDERING IRON
SOLDER WICK
4822 321 40042
e.g. A PAIR OF TWEEZERS
HEATING
HEATING
B
SOLDERING IRON
CLEANING
SOLDER WICK
C


PRECAUTIONS
SOLDERING IRON
CORRECT
COPPER TRACK
SOLDERING IRON
CHIP COMPONENT


MOUNTING
e.g. A PAIR OF TWEEZERS
A
SOLDER
ø0.5-0.8mm
SOLDERING IRON
PRESSURE
SOLDERING TIME
<3 sec/side
SOLDER
ø0.5-0.8mm
B
PRESSURE
SOLDERING IRON


EXAMPLES
CORRECT
SOLDERING IRON
NO!

ABBREVIATIONS

A

ac 0VA	AC 0 Voltage
ac 10VB	AC 10 Voltage
ac 110VB	AC 110 Voltage
ac 120VB	AC 120 Voltage
ac gnd	AC ground
ac h1	AC high voltage 1
ac h2	AC high voltage 2
ac l1	AC low voltage 1
ac l2	AC low voltage 2
ac1	AC voltage 1
ac2	AC voltage 2
ac3	AC voltage 3
amp lr on	Amplifier Left - Right On
amp mute c s	Amplifier mute center surround
amp mute c s sub	Amplifier mute center surround subwoofer
amp mute lr	Amplifier mute Left - Right
amp pd	Amplifier power down
amp prot	Amplifier protection
amp s on	Amplifier surround On
amp stby	Amplifier Standby
av gnd	Audio ground
av l	Audio Left
av r	Audio Right
A/V	Audio/Video

F

f1	Filament 1
f2	Filament 2
fmute	Fast mute

G

gnd d	Ground digital
gnd s	Ground signal

H

hp gnd	Headphone ground
hp l	Headphone Left
hp on	Headphone On
hp r	Headphone Right
hst	Heatsink temperature

L

ls c	Loudspeaker Center
ls gnd	Loudspeaker ground
ls l	Loudspeaker Left
ls r	Loudspeaker Right

M

mdm	Multi channel Decoding Module
mdm c out	— Center out
mdm gnd	— ground
mdm l dmix	— Downmix Left
mdm l in	— Left in
mdm l out	— Left out
mdm r dmix	— Downmix Right
mdm r in	— Right in
mdm r out	— Right out
mdm req	— request
mdm rst	— reset
mdm scl	— I^2C clock
mdm sda	— I^2C data
mdm sl out	— surround Left out
mdm sr out	— surround Right out
mdm sub out	— subwoofer out
mfd	Mains failure detection

P

p gnd	P50 ground
p p50	Cinema link P50 code

S

s gnd	Surround ground
sofac scl	Sofac I^2C clock
sofac1 sda1	Sofac 1 I^2C data1
sofac2 sda2	Sofac 2 I^2C data2
ss ce	Source selector chipenable
ss clk	Source selector clock
ss data	Source selector data
surr pre-out	Surround pre-out

T

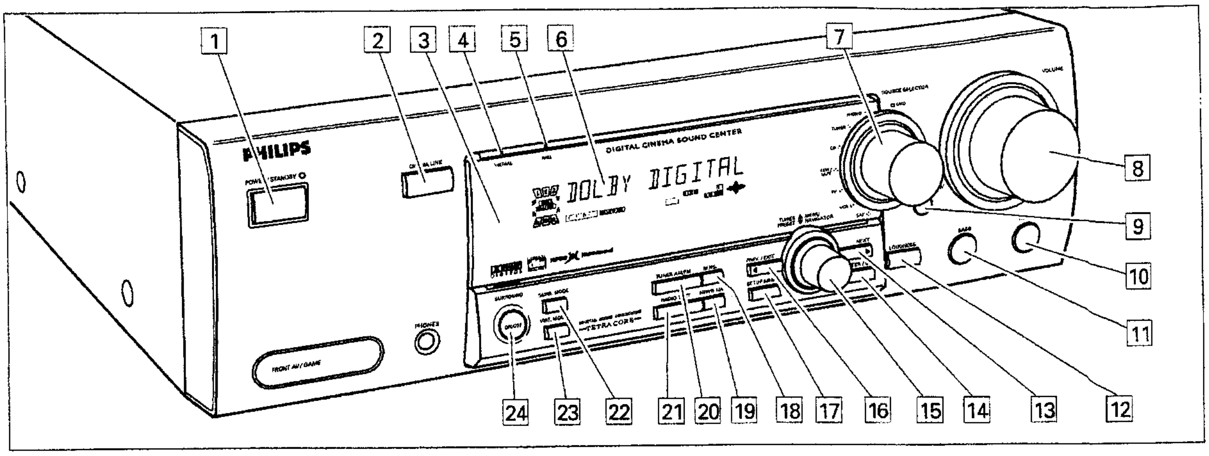
tu clk	Tuner clock
tu da	Tuner data
tu en	Tuner enable
tu gnd	Tuner ground
tu l	Tuner Left
tu r	Tuner Right
tu rds	Tuner RDS
tu stereo	Tuner stereo

V

v gnd	Video ground
v scl	Video I^2C clock
v sda	Video I^2C data
v sig	Video signal
v sub sur	Video subwoofer surround

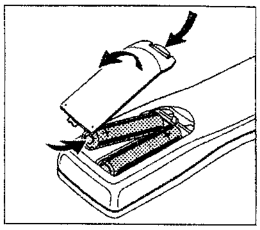
INSTRUCTIONS FOR USE

CONTROLS



1	**POWER / STANDBY**	Switches the receiver on and off.
2	**CINEMA LINK**	Switches the system control bus between the receiver and the TV. on and off.
3		Sensor for the infrared remote control.
4	**VIRTUAL**	Control light for virtual surround.
5	**HALL**	Control light for HALL.
6		Display
7	**SOURCE SELECTOR**	Selects the different audio and video connectors.
8	**VOLUME**	Increases and decreases the volume level.
9	**FRONT AV**	Selects the FRONT AV / GAME input (FR 975 only).
10	**TREBLE**	Adjusts the treble when used in combination with VOLUME.
11	**BASS**	Adjusts the bass when used in combination with VOLUME.
12	**LOUDNESS**	Switches LOUDNESS on and off.
13	**NEXT ▶**	TUNER: searches radio stations. MENU: switches to the next menu level.
14	**ENTER / OK**	Confirms selected menu values.
15	**TUNER PRESET ⬍ MENU NAVIGATOR**	TUNER: switches to the next and previous stored radio station. MENU: moves upwards and downwards.
16	**◀ PREV. / EXIT**	TUNER: searches radio stations. MENU: switches to the previous menu level.
17	**SETUP MENU**	Switches the menu on and off.
18	**SENS.**	Switches between low and high tuner sensitivity.
19	**NEWS/TA**	Switches the RDS news and RDS traffic announcement on and off.
20	**TUNER AM/FM**	Switches the wavebands of the tuner.
21	**RADIO TEXT**	Scrolls through the different RDS information.
22	**SURR. MODE**	Switches through the different speaker configurations.
23	**VIRT. MODE**	Scrolls through the different virtual surround sound modes.
24	**SURROUND ON/OFF**	Switches between the last selected surround mode and stereo.

Remote control usage



Open the battery compartment of the remote control and insert 2 alkaline batteries, type **AA** (R06, UM-3).

Remove batteries if they are flat or the remote control is not going to be used for a long time.

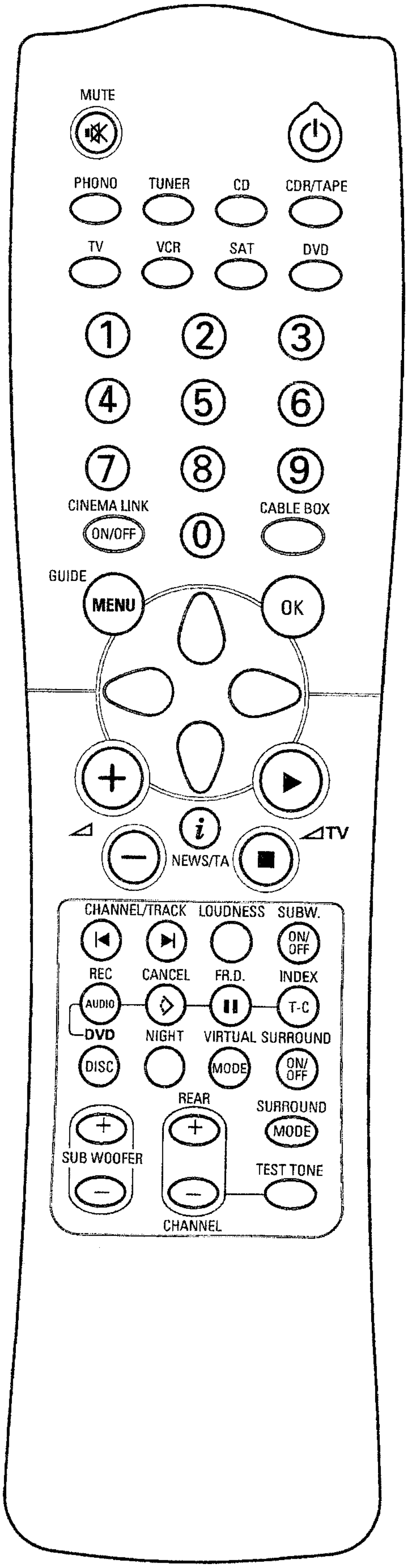
Batteries contain chemical substances, so they should be disposed of properly.

The buttons on the remote control work the same way as the corresponding ones on the receiver.

Important!

You have to press a source button for longer than 1 second to switch the sound source on the receiver. Pressing a source button for less than 1 second will only switch the remote control to use the commands for the selected product.

The remote control remains tuned to the selected source until another source button on the remote control is pressed. This enables you to operate additional sources (i. e. winding a tape) without changing the source on the receiver.


MUTE
PHONO
TUNER
CD
CDR/TAPE
TV
VCR
SAT
DVD
1
2
3
4
5
6
7
8
9
CINEMA LINK
ON/OFF
0
CABLE BOX
GUIDE
MENU
OK
+
⊿
i
NEWS/TA
⊿TV
−
CHANNEL/TRACK
LOUDNESS
SUBW.
ON/OFF
REC
CANCEL
FR.D.
INDEX
AUDIO
T-C
DVD
NIGHT
VIRTUAL SURROUND
DISC
MODE
ON/OFF
REAR
SURROUND
MODE
SUB WOOFER
TEST TONE
CHANNEL

Remote control buttons

🔇 MUTE	Mutes the sound of the receiver.
⏻	Switches the receiver to standby.
PHONO, TUNER, CD, CDR/TAPE, TV, VCR, SAT, DVD	Switches the remote control to the commands of the different products. Selects the sources if pressed longer than 1 second. SAT only works with *digital* satellite receivers.
1–0	Keys in numbers for tracks, stations or frequencies. Numbers consisting of two figures must be keyed in within 2 seconds.
CINEMA LINK ON/OFF	Switches the system connection between the receiver and the TV on and off.
CABLE BOX	Without function.
MENU GUIDE	**TUNER:** Switches the receiver menu on and off. **DVD, TV:** Switches the DVD/TV menu on and off.
OK	Confirms menu options.
Arrow buttons	**TUNER:** Moves in the menus. Right/left arrows are tuning up/down. **CD, CDR:** Left/right arrows are searching backwards/forwards, up/down arrows are selecting the next/previous track.
+⊿	Increases the receiver volume.
–⊿	Decreases the receiver volume.
i NEWS/TA	Switches the functions NEWS and TRAFFIC ANNOUNCEMENT on and off. **TV:** Switches teletext on and off. **SAT:** Switches the information text on and off.
▶ ⊿**TV**	Increases the TV volume. **CD, CDR, VCR, DVD:** Starts playback.
■ ⊿**TV**	Decreases the TV volume. **CD, CDR, VCR, DVD:** Stops playback.
⏮ CHANNEL/TRACK	Selects the previous preset tuner station. **VCR:** Rewinds the tape. **CD, CDR, DVD:** Selects the previous track. **TV:** Selects the previous channel.
⏭ CHANNEL/TRACK	Selects the next preset tuner station. **VCR:** Fast forwards the tape. **CD, CDR, DVD:** Selects the next track. **TV:** Selects the next channel.
LOUDNESS	Switches LOUDNESS on and off.
SUBW. ON/OFF	Switches the subwoofer on and off.
REC, DVD AUDIO	**CDR, VCR:** Starts recording. **DVD:** Switches audio tracks.
CANCEL, DVD ◊	**CD, CDR, SAT, VCR:** Clears a program, cancels selections. **DVD:** Switches the view angle.
FR.D., DVD ❚❚	**TUNER:** Switches to FREQUENCY DIRECT. **CD, CDR, VCR, DVD:** Pauses playback.
INDEX, DVD T-C	**VCR:** Switches the index search on and off. **SAT:** Switches the themes on and off. **DVD:** Switches between title and chapter.
DISC	**CD-, CDR-, DVD-Changers:** Switches to the next disc.
NIGHT	Switches NIGHT MODE on and off.
VIRTUAL MODE	Scrolls through the different virtual surround sound modes.
SURROUND ON/OFF	Switches SURROUND SOUND on and off.
+/– SUBWOOFER	Increases/decreases the subwoofer volume.
+/– REAR	Increases/decreases the volume of the rear speakers. While test tone is on, the volume of the speakers you are hearing can be increased/decreased with these buttons.
SURROUND MODE	Scrolls through the different surround modes.
TEST TONE	Switches the test tone on and off. While test tone is on, the volume of the speakers you are hearing can be increased/decreased with +/– REAR.

Programming the universal remote control

You can identify the universal remote control by the inscription Multibrand/Universal.

The universal remote control must be programmed to use the codes for your appliances of different brands. This is done by keying in a 4-digit code or by scanning the codes until the correct one is found. We recommend to using the 4-digit code. This method is faster and more reliable. The code scanning method should only be used if you cannot find the code for one of your appliances. The code table can be found at the end of the booklet.

Important!
The buttons of the remote control must be used for programming, not the buttons of the receiver or other appliances.

Programming with the 4-digit code

1 Keep the source button for the appliance which should be controlled and ⏻ pressed for 3 seconds.

2 Key in the 4-digit code for the appliance (codetable at the end of the booklet).

Notes: – *If more than 4 digits are entered, the remote control will recognize only the ones keyed in first.*
– *If you do not key in a code within 30 seconds the remote control will switch off the programming function without changing the code.*
– *To program a new appliance, simply overwrite the old code by entering a new one.*

Scanning the codetable

1 Switch on the appliance which should be controlled.

2 Keep the source button for the appliance which should be controlled and ⏻ pressed for 3 seconds.

3 Press and release ⏻ again.
➛The remote control sends the codes for channel up or standby (depending on the selected source) for one brand after the other.

4 As soon as the appliance reacts – switches to the next channel or to standby – press ⏻ to confirm the code.
➛The identified code will be used.

- If the set does not react within 2 minutes, the code for this appliance is not stored in the remote control. The code of the remote control will remain unchanged.

Note: *When taking out the batteries of the remote control for more than 1 minute the codes must be reprogrammed.*

Once you have found and tested the codes for your various appliances, you may want to write them down here.

PHONO ....

TUNER ....

CD ....

CDR/TAPE ....

TV ....

VCR ....

SAT ....

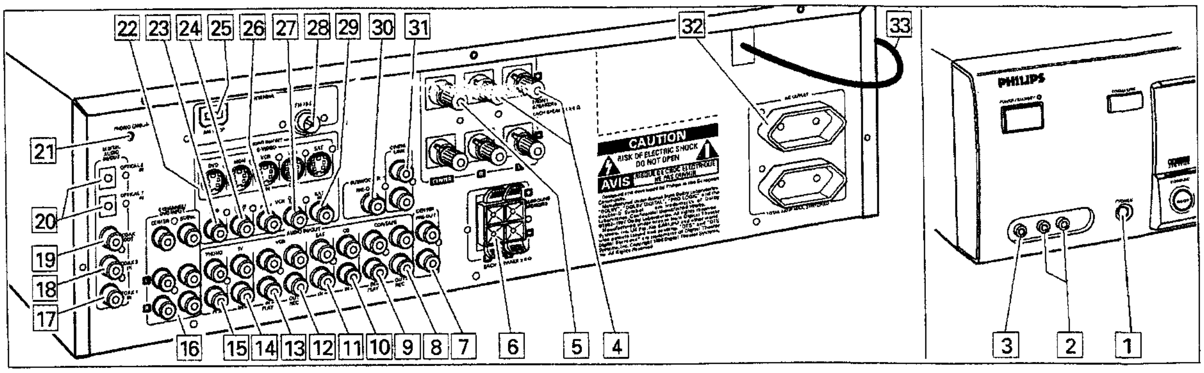
DVD ....

Resetting the remote control

1 Keep one of the source buttons and ⏻ pressed for 3 seconds.

2 Key in the 3-digit code 981.
➛The remote control is now reset to all its original Philips codes.

CONNECTORS

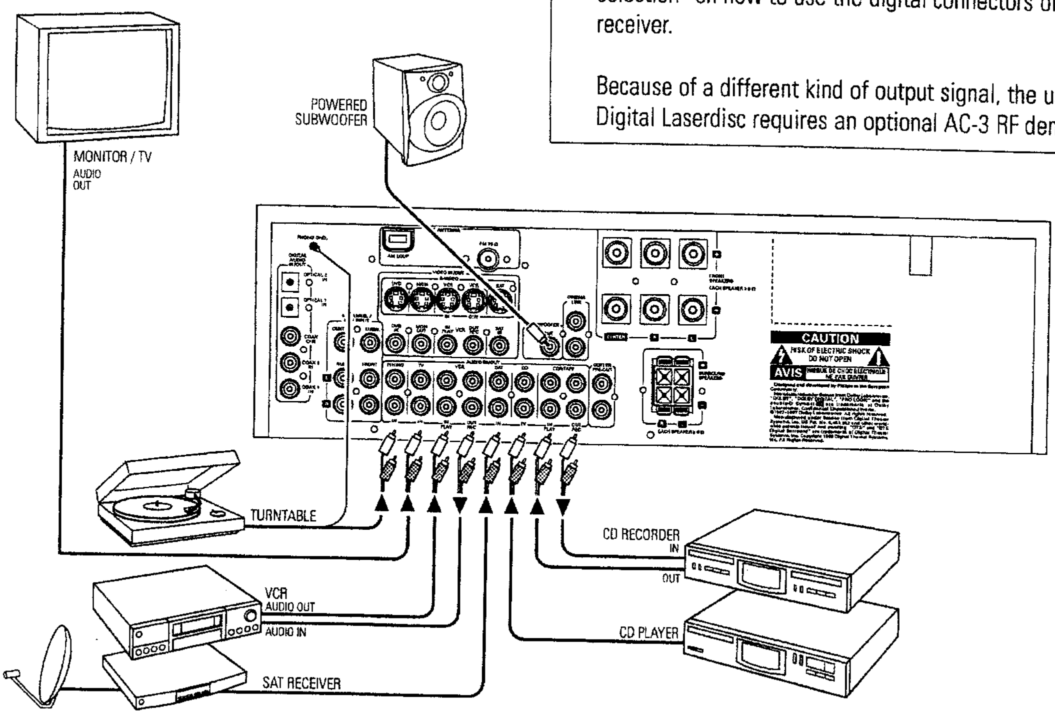


Connectors	Connectors name	Connect to:
6.3 mm headphone socket at the front	1 **PHONES**	A headphone with a 6.3 mm plug.
Audio and video inputs at the front (FR 975 only)	2 **FRONT AV / GAME**	Left and right audio out sockets of appliances such as video cameras and game consoles.
	3 **FRONT AV / GAME**	Video out sockets of appliances such as video cameras and game consoles.
FRONT SPEAKERS	4 **R, L**	Right and left front speaker.
	5 **CENTER**	Center speaker.
SURROUND SPEAKERS	6 **R, L**	Right and left surround speaker.
AUDIO IN/OUT	8 **CDR/TAPE OUT**	Input of a CD recorder or a tape deck.
	9 **CDR/TAPE IN**	Output of a CD recorder or a tape deck.
	10 **CD IN**	Output of a CD player.
	11 **SAT IN**	Output of a satellite system.
	12 **VCR OUT**	Input of a video recorder.
	13 **VCR IN**	Output of a video recorder.
	14 **TV IN**	Output of a TV.
	15 **PHONO IN**	Output of a turntable with MM coil.
	21 **PHONO GND ⏚**	Ground cable of a turntable.
6 CHANNEL / DVD INPUT	16 **6 CHANNEL / DVD INPUT**	6 channel output of appliances such as DVD or laserdisc players.
DIGITAL AUDIO IN/OUT	17 **COAX 1 IN**	Coaxial output of digital appliances (default input for source DVD).
	18 **COAX 2 IN**	Coaxial output of digital appliances.
	19 **COAX OUT**	Coaxial input of digital appliances such as CD recorders or MD recorders.
	20 **OPTICAL IN**	Optical output of digital appliances such as DVD players, CD players, CD recorders or MD players (FR 965 only).
	20 **OPTICAL 1 (2) IN**	Optical output of digital appliances such as DVD players, CD players, CD recorders or MD players (FR 975 only).
VIDEO IN/OUT	22 **S-VIDEO**	S-Video inputs/outputs of video appliances for better video quality (FR 975 only).
	23 **DVD IN**	Output of a DVD player.
	24 **MON OUT**	Input of a monitor (e. g. the TV).
	26 **VCR IN**	Output of a video recorder.
	27 **VCR OUT**	Input of a video recorder (for recording).
	29 **SAT IN**	Output of a satellite system.
Antenna connectors	25 **AM LOOP**	Frame antenna supplied.
	28 **FM 75 Ω**	Wire antenna supplied or exterior antenna.
Preamplified outputs	7 **CENTER PRE-OUT**	Input of a TV when it is used as the centre speaker (only possible when the CINEMA LINK system bus is connected).
	30 **SUBWOOFER PRE-OUT**	Input of a powered subwoofer.
System control bus	31 **CINEMA LINK**	System control bus sockets of a Philips TV with CINEMA LINK.
Mains outlets (not on all versions)	32 **AC OUTLET**	Supplies same voltage as mains. Up to 100 W total permitted load.
Mains lead	33	***After all other connections have been made***, connect the mains lead to the wall socket.

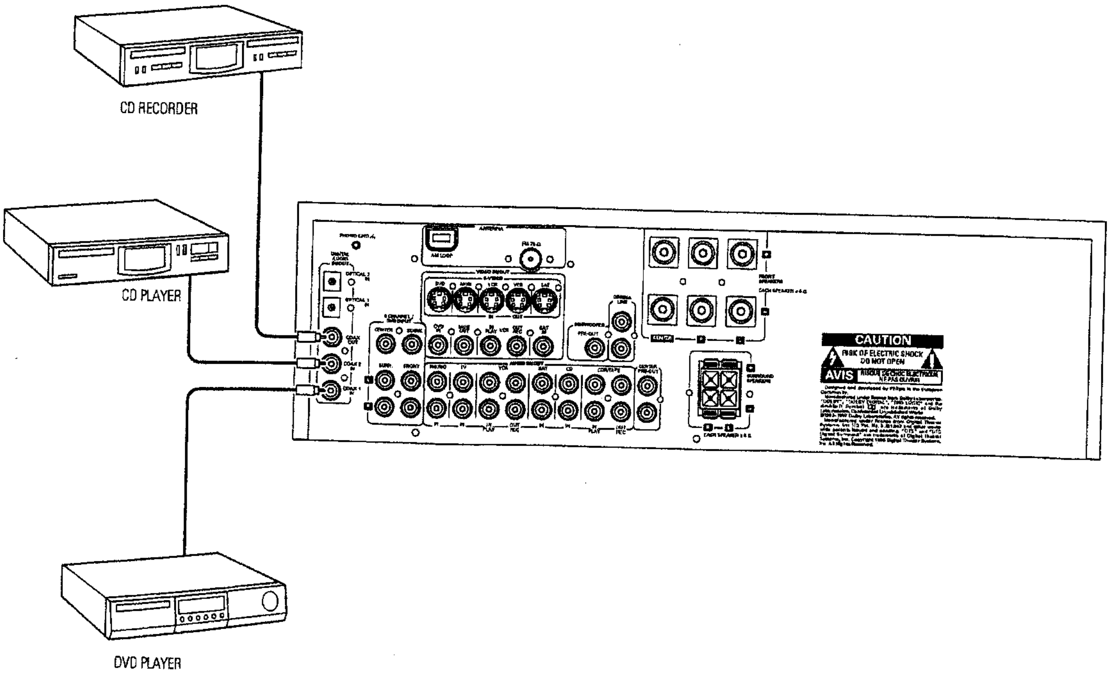
Analogue audio connections

There are analogue and digital connectors available on some appliances. If possible use the digital connection; usually this will result in better sound quality. See "Reassigning a source selection" on how to use the digital connectors of the receiver.

Because of a different kind of output signal, the use of Dolby Digital Laserdisc requires an optional AC-3 RF demodulator.


MONITOR / TV
AUDIO OUT
POWERED SUBWOOFER
TURNTABLE
VCR
AUDIO OUT
AUDIO IN
SAT RECEIVER
CD RECORDER
IN
OUT
CD PLAYER
CAUTION
AVIS

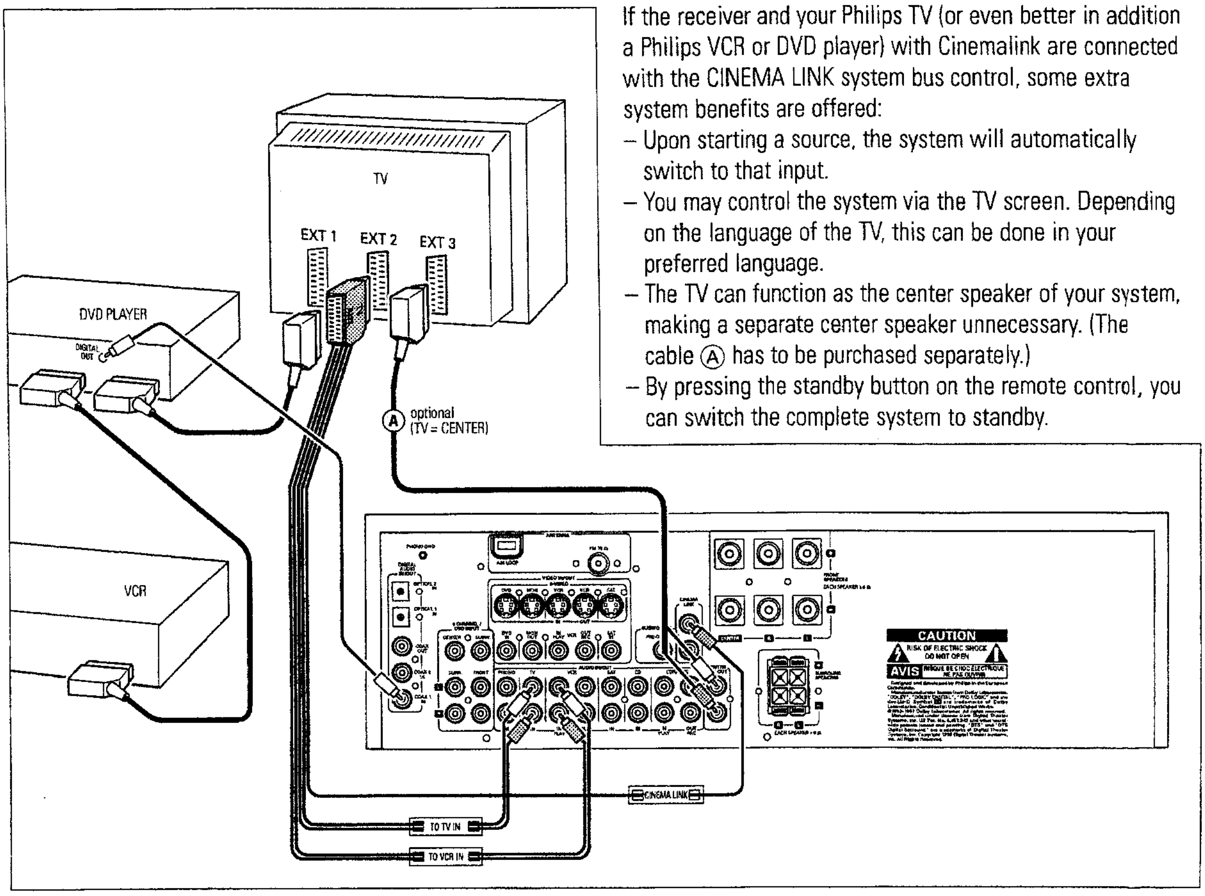
Digital audio connections


CD RECORDER
CD PLAYER
DVD PLAYER
CAUTION
AVIS

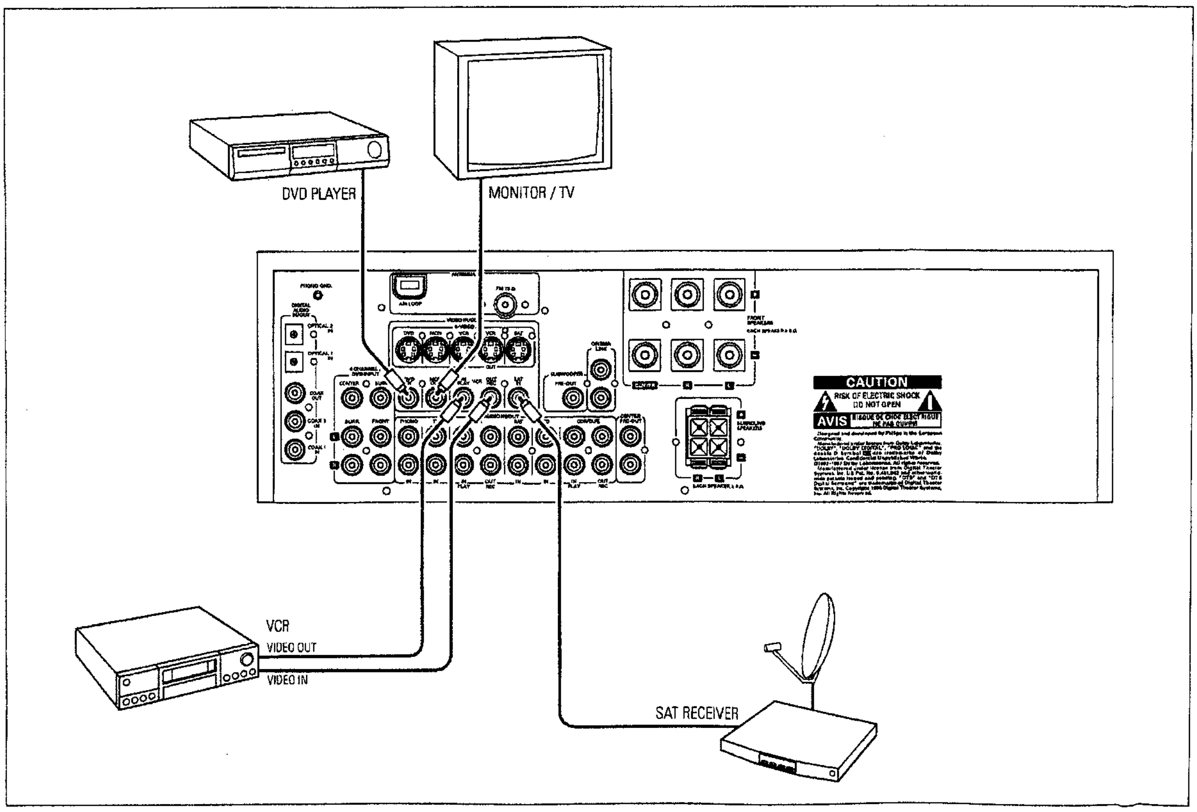
System control bus, CINEMA LINK

If the receiver and your Philips TV (or even better in addition a Philips VCR or DVD player) with Cinemalink are connected with the CINEMA LINK system bus control, some extra system benefits are offered:

- Upon starting a source, the system will automatically switch to that input.
- You may control the system via the TV screen. Depending on the language of the TV, this can be done in your preferred language.
- The TV can function as the center speaker of your system, making a separate center speaker unnecessary. (The cable Ⓐ has to be purchased separately.)
- By pressing the standby button on the remote control, you can switch the complete system to standby.


TV
EXT 1
EXT 2
EXT 3
DVD PLAYER
DIGITAL OUT
VCR
Ⓐ optional (TV = CENTER)
CINEMA LINK
TO TV IN
TO VCR IN
CAUTION
RISK OF ELECTRIC SHOCK DO NOT OPEN
AVIS

Video connections


DVD PLAYER
MONITOR / TV
VCR
VIDEO OUT
VIDEO IN
SAT RECEIVER
CAUTION
RISK OF ELECTRIC SHOCK DO NOT OPEN
AVIS

Mains

The type plate is located on the rear of the receiver.

1 Check whether the mains voltage as shown on the type plate corresponds to your local mains voltage. If it does not, consult your dealer or service organization.

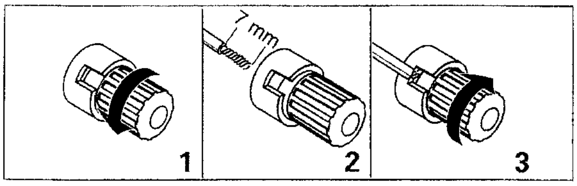
2 Connect the mains cable to the wall socket.

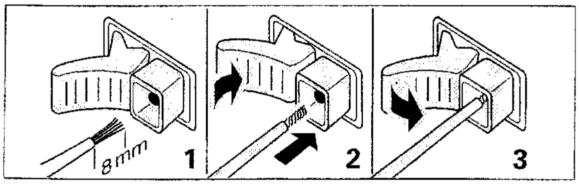
To disconnect the set from the mains completely, remove the mains plug from the wall socket.

For users in the U. K.: please follow the instructions on page 2.

Speaker connections

Some of the speaker connections on the receiver are screw connectors and some are click-fit connectors. Use them as shown below.





1 Always connect the coloured (or marked) wire to the coloured terminal and the black (or unmarked) wire to the black terminal.

2 Connect:
 – Left front speaker to L (red and black)
 – Right front speaker to R (red and black)
 – Center speaker to CENTER (blue and black)
 – Left surround speaker to SURROUND L (grey and black)
 – Right surround speaker to SURROUND R (grey and black)

TV as the center speaker

You may use your Philips TV with CINEMA LINK as the center speaker. For TVs with a scart connector an additional audio cinch-to-scart cable is needed. For TV's with cinch connectors additional cinch cables are needed. These cables must be connected to the blue CENTER PRE-OUT connector on the back. Look into the instruction manual of your TV on how to use it as the center speaker.

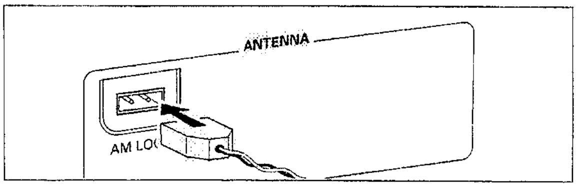
Antenna connections

AM (MW) antenna

The loop antenna supplied is for indoor use only. Position the antenna as far away as possible from the receiver, the TV, the cables, a DVD player, a VCR and other radiation sources.

1 Fit the plug of the frame antenna to AM LOOP as shown below.

2 Turn the antenna for optimum reception.



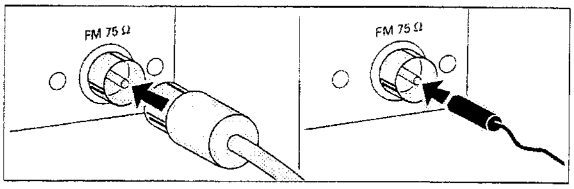
FM antenna

The wire antenna supplied can only be used to receive nearby stations. For better reception we recommend using a cable antenna system or an outdoor antenna.

1 Fit the supplied wire antenna to FM 75 Ω as shown below.

2 Move the antenna in different positions for optimum reception.

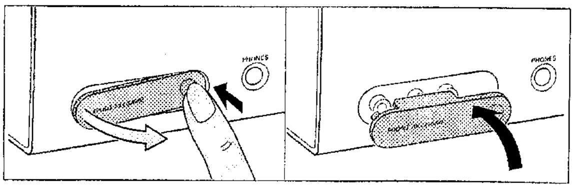
- If you are using a cable antenna system or an outdoor antenna, fit the antenna plug to FM 75 Ω instead of the wire antenna.

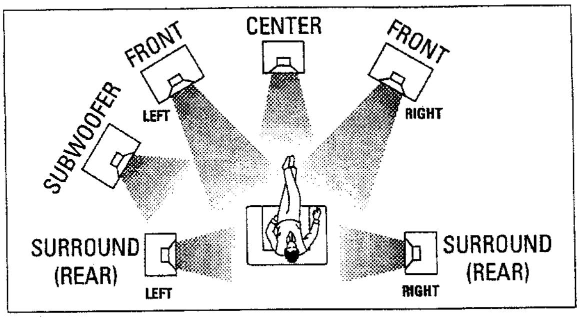


FRONT AV / GAME cap (FR 975 only)

- To remove the FRONT AV / GAME cap, press on the right side of the cap.

- Insert the cap from below to close the compartment.





Positioning of the speakers

General hints for positioning

Avoid positioning the speakers in a corner or on the floor as this will boost the bass tones too much. Placing the speakers behind curtains, furniture, etc. will reduce the treble response. The listener should always be able to "see" the speakers.

Each room has different acoustic characteristics and the positioning possibilities are often limited. You can find the best position for your speakers by referring to the picture above.

As a minimum we recommend 5 speakers (2 front, a center, 2 surround) for good surround sound. It is possible to reproduce some kind of surround sound with fewer speakers. This is done by redirecting the signals which are foreseen for the missing speakers to the existing ones. See "Menus" on how to set up the receiver correctly for the number and size of the speakers used.

Positioning the front speakers

The front speakers should be placed right and left in front of the listening position like usual stereo speakers.

Positioning the center speaker

The center speaker should be placed in the center between the two front speakers, e. g. underneath or on top of the TV. The best height for the center speaker is the height of the listener's ears (while seated).

Positioning the surround speakers

The surround speakers should face each other and be in line with, or slightly behind the listener.

Positioning the subwoofer

A subwoofer can be used to enhance the bass performance of your system dramatically. The subwoofer can be positioned anywhere in the room, because it is not possible to locate the source of deep tones. Nevertheless, you should not place the subwoofer in the middle of a room, since the bass could be severely weakened. Do not place any object on the subwoofer.

Speaker setup and testing

The relative volume of the speakers must be adjusted for optimal surround sound. You should be at your usual listening position when adjusting the speaker volume. See "Receiver menus" on how to set up the receiver for the used speakers. Ideally, the volume in the listening position should be the same from all speakers.

1 Press POWER / STANDBY to switch on the receiver.

2 Press TEST TONE on the remote control.
→ A test tone coming from the different speakers, except the subwoofer, is heard.

3 Press + / − REAR on the remote control to increase/decrease the volume of the actual speaker. The best result is achieved when all speakers have equal volume in the listening position.

4 Press TEST TONE on the remote control.
→ The test tone stops.

Note: If you are not completely satisfied with the volume settings, we recommend making minor adjustments to them during surround sound playback.

Power handling

If the receiver is used at very high power it can produce distortions which may seriously damage your speakers. If distortions occur, reduce the volume and the tone controls to a level where the sound is acceptable again.

To avoid overheating of the set a safety circuit has been built in. Therefore your set may disconnect under extreme conditions. If this happens, switch the set off and let it cool down before reusing it.

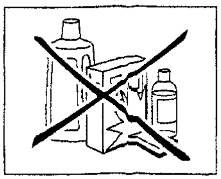
Headphones

Connecting headphones to PHONES will switch off the speakers. The receiver switches to STEREO and surround sound will be reduced to a stereo signal which is reproducible by standard headphones.

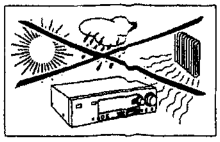
Disconnecting the headphones switches on the speakers again. If you wish to enjoy surround sound again, switch the receiver back to surround sound.

Maintenance

Clean the receiver with a soft, slightly dampened, lint-free cloth. Do not use any cleaning agents as they may have a corrosive effect.



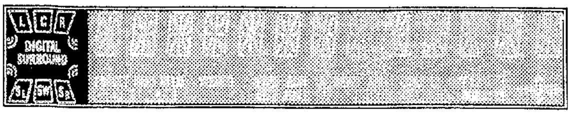
Do not expose the receiver to humidity, rain, sand or excessive heat (caused by heating equipment or direct sunlight).



Display

The display of the receiver is divided into 4 sections, which are to be used for the following:

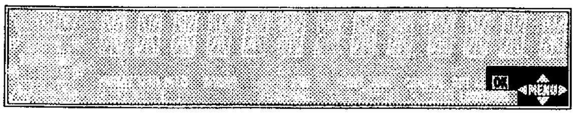
Speaker diagram



A rectangle with a letter in it shows that a speaker has been selected in the setup menu. However, the subwoofer indicator will only light when a subwoofer signal is available. If only a letter is shown, this speaker is not used and its sound is reproduced by the other speakers.

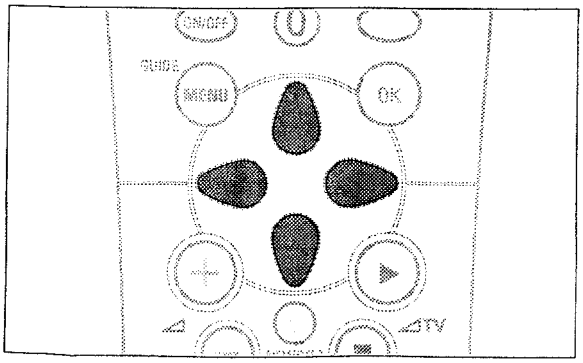
))) (((	virtual surround sound
SURROUND	surround sound is reproduced
DIGITAL SURROUND	digital surround sound is reproduced
L, R	front left and right speaker
C	center speaker
SL, SR	surround speakers
SW	subwoofer

Menu indication

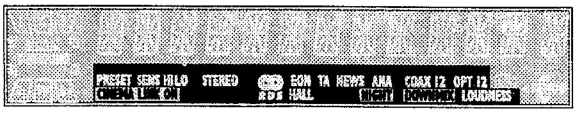


These signs show you if the menu is on or off and indicate in which direction you may move.

MENU	menu is on
◀	You may move backwards to the previous menu topic using ◀ PREV. / EXIT ("left" key on the remote control).
▲	You may move up in an option list using ⬍ MENU NAVIGATOR ("up" key on the remote control).
▼	You may move down in an option list using ⬍ MENU NAVIGATOR ("down" key on the remote control).
▶	You may move forward to the next menu topic using NEXT ▶ ("right" key on the remote control).
OK	You may confirm the displayed value.



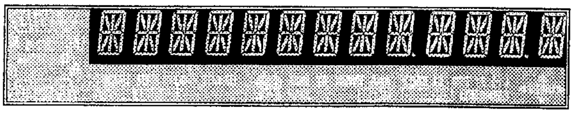
Status lights



Signs showing you various settings and information about the status of the receiver.

PRESET	Tuner is tuned to a preset radio station.
SENS HI	Tuner is switched to high sensitivity.
SENS LO	Tuner is switched to low sensitivity.
CINEMA LINK ON	CINEMA LINK is active
STEREO	An FM station is being received in stereo.
RDS	An RDS station is being received.
EON	An RDS station with EON is being received.
HALL	HALL effect is on.
TA	RDS traffic announcement is on
NEWS	RDS news announcement is on
ANA	Analogue input is being used for the playing source.
NIGHT	NIGHT MODE is on.
COAX 1	Coaxial digital input COAX 1 is being used for the playing source.
COAX 2	Coaxial digital input COAX 2 is being used for the playing source.
DOWNMIX	Incoming multi channel signals are being reduced to fewer output signals (depending on the number of speakers).
OPT	Optical digital input OPTICAL IN is being used for the playing source (FR 965 only).
OPT 1	Optical digital input OPTICAL 1 IN is being used for the playing source (FR 975 only).
OPT 2	Optical digital input OPTICAL 2 IN is being used for the playing source (FR 975 only).
LOUDNESS	LOUDNESS is switched on.

Information area



This area is used for feedback of the receiver, tuner frequencies, menu options, values and scrolling text messages.

Receiver menu

The receiver is equipped with a menu system. The menu is used for the setup of the receiver. The different menu options are related to each other in a logical way. Let's assume you have no center speaker connected, and therefore switched CENTER SPEAKR to NO. If you try to use VOL CENTER, a message will be scrolled that this is not possible (INSTALL CENTER SPEAKER).

The menu always works the same way. Arrows in the display show you the possible moving directions.

1 Press SETUP MENU.
→MENU, and * EFFECTS is displayed.

- **You can exit the menu at any time by pressing SETUP MENU.**

2 Turn ▲▼ MENU NAVIGATOR until the desired option (or a value) is displayed.

3 Press NEXT ▶ to choose the displayed option (or ENTER / OK to confirm a value).

- You can leave any option (values remain unchanged) by pressing ◀ PREV. / EXIT.

Menu structure

* EFFECTS
Switches sound effects.
— VIRT SURR
virtual surround: 0…100 %

* VOL BALANCE
Adjusts the relative volume balance between the connected speakers.
— TEST TONE
Test tone: on/off
— VOL FRONT-L
Volume front left speaker: –50…+50
— VOL FRONT-R
Volume front right speaker: –50…+50
— VOL CENTER
Volume center speaker: –50…+50
— VOL REAR-L
Volume rear left speaker: –50…+50
— VOL REAR-R
Volume rear right speaker: –50…+50
— VOL SUBWOOFER
Volume subwoofer: –50…+50

Note: When using the 6 CHANNEL / DVD INPUT *the values below cannot be changed.*

* SPEAKR SETUP
Selects the used speakers.
— SUBW PRESENT
Subwoofer present: yes/no
— CENTER SPEAKR
Center speaker present: yes/no
— REAR SPEAKER
Rear speakers present: yes/no

* SPEAKR SIZES
Chooses the speaker sizes of the used speakers, for optimal sound reproduction. LARGE indicates a speaker which can reproduce frequencies lower than 50 Hz. If SUBW PRESENT is set to NO, FRONT SIZE can only be set to LARGE. If FRONT SIZE is set to SMALL, CENTER SIZE can only be set to SMALL and consequently a subwoofer must be connected.
— FRONT SIZE
Left and right front speakers: small/large
— CENTER SIZE
Center speaker: small/large
— REAR SIZE
Rear speakers: small/large

* SPK DISTANCE
Distance between the usual listening position and the speakers. This defines the delay time for the surround sound.
— DISTANCE L/R
Distance to front speakers: 1…10 m
— DISTANCE CNTR
Distance to center speaker: 1…10 m
— DISTANCE REAR
Distance to rear speakers: 1…10 m

* SELECT INPUT

Assigns the audio input connectors to the different source selections chosen with SOURCE SELECTOR (see "SOURCE SELECTION" for details).

- COAX 1
  Digital coaxial input 1, COAX 1 IN
- COAX2
  Digital coaxial input 2, COAX 2 IN
- OPT (FR 965 only)
  Digital optical input, OPTICAL IN
- OPT 1 (FR 975 only)
  Digital optical input, OPTICAL 1 IN
- OPT 2 (FR 975 only)
  Digital optical input, OPTICAL 2 IN
- SAT IN
  Analogue audio input SAT IN
- VCR IN
  Analogue audio input VCR IN
- TV IN
  Analogue audio input TV IN
- CDR IN
  Analogue audio input CDR IN
- CD IN
  Analogue audio input CD IN
- 6 CH IN
  Analogue audio input 6 CHANNEL / DVD INPUT

* TUNER

Setup for preset radio stations (see "TUNER" for details).

- AUTO INSTALL
  Stores radio stations automatically
- MAN INSTALL
  Stores radio stations manually
- GIVE NAME
  Allows to assign names to stored radio stations
- RESHUFFLE
  Resorts stored radio stations

TV menu

If the receiver is connected to a Philips CINEMA LINK TV via the CINEMA LINK system control bus sockets (see "CONNECTIONS"), you may use the TV to set up the system. An option called RECEIVER will be added to the TV menu.

If CINEMA LINK is on, adjustments on the receiver will be shown on the TV screen for a few seconds. Consult the instruction booklet of your TV on how to use the TV menu. The options offered may vary by TV model.

Switching the connection

- Press CINEMA LINK to switch the connection between the receiver and the TV either on or off.
  → If the connection is switched on, **CINEMA LINK ON** is displayed.

Note: *We recommend switching* CINEMA LINK *off during recording. This avoids unwanted interruptions due to switching TV functions.*

If CINEMA LINK is switched on and the TV menu is active, TV MENU is displayed and the menu and sound functions on the receiver are locked.

SOURCE SELECTOR

When selecting a source by turning SOURCE SELECTOR, the audio and video inputs with the corresponding name are activated. The incoming signal is reproduced by all audio and – if the source includes a video signal – video outputs of the receiver. It is possible to reassign a source selection to other than these standard inputs.

Source selected	**Connectors used**
DVD	COAX 1 digital audio input and DVD IN video input
PHONO	PHONO IN audio input
TUNER	The tuner part of the receiver is used, all inputs are switched off.
CD	CD IN audio input
CDR/TAPE	CDR/TAPE IN audio input
TV	TV IN audio input and no video input
VCR	VCR IN audio input and VCR IN video input
SAT	SAT IN audio input and SAT IN video input

6 CHANNEL / DVD INPUT selection

The 6 CHANNEL / DVD INPUT connectors can be assigned to any of the available sources (excluding TUNER and PHONO). The assignment can be done via the * SELECT INPUT option in the menu. See below for more details.

Reassigning a source selection

If a source is selected with SOURCE SELECTOR the standard audio input is used. To change this, the source selection must be reassigned to another audio input.

Example: Reassigning CD from the analogue CD IN audio input to the digital COAX 2 IN audio input.

1 Choose * SELECT INPUT from the menu and press NEXT ▶.

2 Turn SOURCE SELECTOR to select the source which should be reassigned (e. g. CD).
→The name of the source is displayed and the light of the source flashes.

3 Turn ⇕ MENU NAVIGATOR to select the input connectors which should be used (e. g. CD -> COAX2).

4 Press ENTER / OK to confirm your selection.
→STORED is displayed briefly.

5 This source selection is now using the chosen audio input (e. g. CD uses the COAX 2 IN input connectors, **COAX 2** lights when switching to CD).

Using one source selection for two or more appliances

You may assign more than one source to a source selection. This can be useful when products are connected one after the other in a chain.

Example: A VCR is connected to the TV but only the TV is connected to the receiver. Both SOURCE SELECTOR settings, TV as well as VCR, have to use the TV input connectors.

1 Choose * SELECT INPUT from the menu and press NEXT ▶.

2 Turn SOURCE SELECTOR to select the source which should be reassigned (e. g. VCR).
→The name of the source is displayed and the light of the source flashes.

3 Turn ⇕ MENU NAVIGATOR to select the input connectors which should be used (e. g. VCR -> TV IN).

4 Press ENTER / OK to confirm your selection.
→STORED is displayed briefly.

5 This source selection is now using the chosen audio input (e. g. VCR uses the TV IN input connectors, VCR <TV IN> is displayed briefly when switching to VCR).

About 6 CHANNEL / DVD INPUT

The 6 CHANNEL / DVD INPUT can be used to connect a device with a built-in multichannel decoder (e.g. Dolby Digital, DTS, etc.) and 6-channel output connector, i. e. a high end DVD player.

When using the 6 CHANNEL / DVD INPUT audio input, the receiver works as a multichannel amplifier. The source reproduces surround sound and sends it to the receiver divided into the necessary channels. Therefore the SURROUND ON/OFF, HALL and SURR. MODE button have no effect since the provided signal is already multichannel.

From a source which is connected to the 6 CHANNEL / DVD INPUT audio input cannot be recorded.

PLAYBACK, RECORDING

Playing a source

1 Press POWER / STANDBY to switch on the receiver.

2 Turn SOURCE SELECTOR to select a source.
→The name of the source is displayed.

- You can select the FRONT AV / GAME input by pressing FRONT AV (FR 975 only).

3 Start playback of the source as usual.

Adjusting the sound

- Turn VOLUME to adjust the volume.
→VOLUME and the volume level between 0 and 50 is displayed.

1 Press BASS or TREBLE.
→BASS or TREBLE and the actual value are displayed briefly. Then TURN VOLUME KNOB TO CHANGE is scrolled.

2 Turn VOLUME to adjust the bass or treble.
→BASS or TREBLE and the actual value are displayed.

Note: *If* VOLUME *is not turned within 5 seconds or if any other control is used, the bass or treble adjustment is switched off.*

- If a subwoofer is connected, press SUBW. ON/OFF to increase the bass performance.

Note: *In case of digital surround sound, a subwoofer signal will only be available when supported by the source material.*

- Press LOUDNESS to switch loudness either on or off.
→**LOUDNESS** is displayed if loudness is on.

Recording from a source

If you wish to record from a source you must select it with SOURCE SELECTOR. The incoming signal is reproduced by all audio and – if the source includes a video signal – video outputs of the receiver. The sound settings do not affect the recording.

1 Turn SOURCE SELECTOR (or press FRONT AV – FR 975 only) to select the source you want to record from.
→The name of the source is displayed.

2 Prepare the desired recording appliance. It must be connected to one of the outputs of the receiver.

3 Start recording on the recording appliance.

4 Start the playback of the source as usual.

Notes: – *The audio and video signal of* VCR IN *is not reproduced by* VCR OUT. *The same applies to the audio signal of* CDR/TAPE IN to CDR/TAPE OUT.
– *We recommend not to use the digital output* COAX OUT *of the receiver to record from an analogue source. Use the analogue output* CDR/TAPE *instead.*
– *From a source which is connected to the* 6 CHANNEL / DVD INPUT *audio input cannot be recorded.*

Recording from the digital output

It is possible to connect a digital recorder to the digital output of the receiver. In this way, all signals coming from the digital inputs can be recorded directly on the connected audio recorder. The receiver will also convert all signals coming from the analogue inputs to the digital output.

The receiver can be used to record digitally a multichannel surround sound audio signal (Dolby Digital, DTS or MPEG) from, for example, DVD to CD-R. The receiver will convert the digital multichannel signal into a stereo signal without loss of relevant sound information.

Notes: – *When recording a Dolby Digital, DTS or MPEG signal, each track must be recorded individually.*
– *Digital recording is not possible when the digital source material is copy-protected.*

About surround sound

Surround sound gives you a complete new listening sensation. You will have the feeling of being in the middle of the action, because sound is coming from everywhere around you. Look out for TV broadcasts, audio and video tapes and discs with the DOLBY SURROUND, DOLBY DIGITAL, dts or MPEG Multichannel marks which are encoded for multichannel surround sound. You should prefer Dolby Digital, DTS or MPEG Multichannel to get the best out of your receiver.

The FR 965 and FR 975 are able to reproduce DTS surround sound. DTS is a premium multichannel surround sound system available on DVD discs, laserdiscs and audio discs. Consult your software dealer on the availability of DTS software in your region.

Notice that DVD discs do not always carry full multichannel surround. To be sure that a disc is multichannel encoded consult your dealer.

Most ordinary stereo tapes and discs can be replayed using surround sound settings with good results. If the reproduction is distorted in surround mode, switch to normal stereo mode.

The availabilty of the various surround sound modes described depends on the number of speakers used and the incoming sound information.

Switching surround sound

With surround sound on, you can switch through the different surround modes. Note that the possibilities are related to speaker setup defined in the receivers menu.

If a digital surround signal is detected, the receiver will scroll either DOLBY DIGITAL, DTS or MPEG.

1 Press SURROUND ON/OFF to switch on the surround sound.
→The surround mode in use is scrolled.

2 Press SURR. MODE repeatedly to listen to the different surround modes (if available).
→The chosen mode and the speakers used are displayed. If the incoming multichannel signals are reduced to fewer output signals, **DOWNMIX** is displayed.

3 Press VIRTUAL MODE as often as necessary to switch through the virtual surround sound modes:
1 × to activate 3D SURRUOND
2 × to activate MULTI FRONT
3 × to activate MULTI REAR
4 × to activate NATURAL SURROUND
→A light indicates if a virtual surround sound mode is on. ◗-signs indicate which virtual surround sound mode is active.

4 Press SURROUND ON/OFF to switch off the surround sound.
→SURROUND OFF is scrolled.

Surround sound settings

HALL

The sound reproduction is enhanced and a slight echo is added. This gives the impression of being in a large room. Can only be used in stereo mode.

SURROUND

The surround mode enables normal surround sound reproduction with 4 or 5 speakers. Depending on the source material, Dolby Surround Pro Logic, Dolby Digital, DTS or MPEG is reproduced.

PRO LOGIC, DOLBY DIGITAL, DTS, MPEG

In addition to SURROUND, the surround mode used – depending on the source material – will be displayed. In case of digital surround, the sound format AC-3 (for Dolby Digital), DTS or MPEG (for MPEG 2 Multichannel) will be displayed, followed by the sound channels, available on the source (e. g. DVD).

Example:	AC-3 3/2.1	Dolby Digital, 3 front channels, 2 surround channels and a subwoofer channel.
	MPEG 2/0.0	MPEG Multichannel, stereo sound only.
	AC-3 3/1.0	Dolby Digital, 3 front channels, 1 (mono) surround channel without subwoofer signal.
	DTS 3/2.1	DTS, 3 front channels, 2 surround channels and a subwoofer channel.

FRONT-3 STEREO

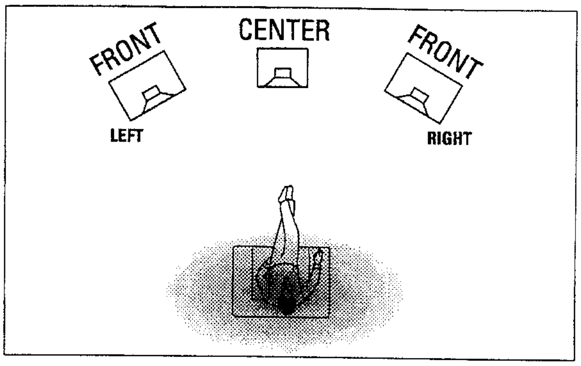
The surround sound is muted. 3 Stereo lets you listen to surround sound without using the surround speakers.

STEREO

All sound is reproduced and played through the front left and right speakers. This enables standard stereo reproduction.

Virtual Surround

Your receiver is able to reproduce one or more forms of virtual surround sound. Virtual surround gives a more real life sound impression by creating phantom speakers in addition to or instead of real speakers. The position of the listener influences the surround effect. The area where the effect is best is shown in grey.



The level of virtual surround sound effect can be adjusted in the setup menu. The following surround sound modes are available:

3D SURROUND

No rear speakers are needed. The sound of the rear channel is simulated by the front speakers. Surround sound is simulated through the front left, right and center speakers.

MULTI FRONT

Phantom speakers are created next to the left and right front speaker.

MULTI REAR

Phantom speakers are created next to the left and right rear speaker.

NATURAL SURROUND

Phantom speakers are created next to the left and right front and rear speakers.

Note: The availability of MULTI FRONT *and* MULTI REAR *depends on the sound channels on the source material.*

NIGHT MODE (only on the remote control)

The loud parts of the sound are lowered and the soft passages are raised. You can enjoy surround sound without disturbing sleeping children or neighbours. Night mode only works with Dolby Digital and MPEG, and only if supported by the source material.

Tuning to radio stations

You can search for radio stations by scanning the frequency band. You can also key in the frequency of a known radio station. If an FM station is being broadcast and received in stereo, **STEREO** is shown.

Searching for radio stations

1 Turn SOURCE SELECTOR to select the tuner.
→TUNER is displayed.

2 Select a waveband by pressing TUNER AM/FM repeatedly.
→The selected waveband is displayed.

3 Keep ◀ or ▶ pressed for approximately 1 second.
→SEARCH is displayed and the tuner tunes to a station with sufficient strength.

4 Repeat this procedure until you find the desired station.

- To fine tune to a weak transmitter, briefly press ◀ or ▶ as often as necessary for optimum reception.

Tuning to a radio station by frequency (with the remote control only)

1 Press TUNER.
→TUNER is displayed.

2 Press FR. D..
→_ is displayed.

3 Use 1–0 to key in the frequency of a radio station.

Note: Only valid numbers within the frequency range of the tuner can be keyed in.

Switching FM sensitivity

You can switch the tuner to a lower search sensitivity, to search only for stations with a strong signal (FM only).

1 Turn SOURCE SELECTOR to select the tuner.
→TUNER is displayed.

2 Press SENS. on the receiver.
→Either **SENS HI** or **SENS LO** is displayed for 5 seconds.

Note: While searching for radio stations, the actual sensitivity is displayed. In this case, **SENS LO** *means the tuner is only looking for radio stations with a strong signal.*

Storing radio stations

You may store up to 30 radio stations in the memory. The receiver can select and program radio stations by itself or you can choose them yourself.

Automatic programming

1 Choose * TUNER from the menu and press NEXT ▶.

2 Choose AUTO INSTALL and press NEXT ▶.
→The preset number where programming will start, the waveband and AUTO are displayed.

3 Turn TUNER PRESET ⬍ to change the preset number where programming should start.

4 Use TUNER AM/FM to switch to the desired waveband.

5 Press ENTER / OK to start programming.
→AUTO INSTALL flashes and all available radio stations are programmed, this may take a few minutes. Programming is done when AUTO INSTALL stops flashing.

Manual programming

1 Choose * TUNER from the menu and press NEXT ▶.

2 Choose MAN INSTALL and press NEXT ▶.
→A preset number, the waveband and the frequency are displayed.

3 Turn TUNER PRESET ⬍ to change to the preset number where the radio station should be stored.

4 Tune to the desired radio station (see "Searching for radio stations").

5 Press ENTER / OK to confirm your selection.
→STORED is displayed briefly. The radio station is programmed at the chosen preset number.

6 Select and store all desired radio stations this way.

Tuning to stored radio stations

1 Turn SOURCE SELECTOR to TUNER to select the tuner.
→TUNER is displayed.

2 Turn TUNER PRESET ⬍ to select a preset radio station.
→**PRESET**, the preset number and station are displayed.

Resorting stored radio stations

After programming radio stations, you might want to change their sequence. RESHUFFLE allows you to exchange the positions of presets.

1 Choose ✱ TUNER from the menu and press NEXT ▶.

2 Choose RESHUFFLE and press NEXT ▶.
→**PRESET**, a preset number and station are displayed.

3 Turn TUNER PRESET ⬍ to select a preset station.

4 Press ENTER / OK to confirm the selection.
→The selected preset number SWAP (-) and a second preset number are displayed.

5 Turn TUNER PRESET ⬍ to select the other preset station.

6 Press ENTER / OK to confirm the exchange.
→RESHUFFLED is displayed briefly and these two preset numbers are swapped.

Naming radio stations

It is possible to assign a name to any of the preset radio stations. RDS station names also can be overwritten.

1 Choose ✱ TUNER from the menu and press NEXT ▶.

2 Choose GIVE NAME and press NEXT ▶.
→A preset radio station is displayed.

3 Turn TUNER PRESET ⬍ to select the preset to be renamed.

4 Press ENTER / OK to confirm your selection.
→The existing name or -------- is displayed.

5 Turn TUNER PRESET ⬍ to select a letter and NEXT ▶ or ◀ PREV. to move to the next or previous position.

6 After you have entered the entire name, press ENTER / OK to confirm.
→STORED is displayed and the name is stored.

Note: If you want to use the transmitted RDS station name again, simply clear the given name.

Clearing station names

1 Use the menu option ✱ TUNER, choose GIVE NAME.
→A preset radio station is displayed.

2 Turn ⬍ MENU NAVIGATOR to select the name to be cleared.

3 Press ENTER / OK to confirm your selection.

4 Press ◀ PREV. while the first letter is flashing.
→ CL is flashing to the left of the station name.

5 Press ENTER / OK to clear the station name.
Or, if you have changed your mind,
press ◀ PREV. to leave the station name as it is.

RDS RDS

Radio **D**ata **S**ystem is a service that allows FM stations to send additional information. If you are receiving an RDS station, RDS and the station name are displayed.

Switching through different RDS information

- Press RADIO TEXT on the receiver repeatedly to switch through the following information (if available):
  - Radio text messages
  - RDS clock
  - Frequency
  - Station name

Note: The time signal broadcasted from certain RDS stations may not always be accurate.

RDS News and Traffic Announcement

It is possible to set up the tuner in such a way that any playback is interrupted by news or traffic information of a chosen RDS station. Announcement functions only work if the necessary RDS signals are being broadcast.

If RDS stations are also carrying an EON signal (**E**nhanced **O**ther **N**etworks), **EON** is displayed. This signal enables the tuner to search not only the chosen RDS station, but the whole EON station network for news and traffic information.

1 Tune to the desired RDS station.

2 Press NEWS/TA:
Once to display **NEWS**, this switches on the news announcement function.
Twice to display **TA**, this switches on the traffic announcement function.
Three times to display **TA** and **NEWS**, this switches on both announcement functions.

3 Select and play any other source as usual.
→ While news or traffic information is being broadcast the receiver will switch to tuner and **NEWS** or **TA** will flash.

4 Press NEWS/TA until the display indication disappears to switch off the function(s).
or
Press NEWS/TA during an announcement to switch off the function(s).

Note: Be sure to switch the news and traffic announcement off during recording, otherwise these announcements also will be recorded.

Remote Control / Remote Control Buttons

The following should be read instead of the original text

🔇 MUTE ....Mutes the sound of the receiver in all modes, except TV.
Mutes the sound of your Philips TV set if your remote control is in TV mode.

⏻ ....Switches the source selected on your remote control (e.g. VCR, TV) to standby.
When pressed longer than 2 seconds, the receiver switches to standby.

Connections / Analog Audio Connections

Please read the following text as additional to the text

DTS Digital Surround™ is a discrete 5.1-channel digital audio format available on CD, LD, and DVD software which consequently cannot be decoded and played back inside most CD, LD, or DVD players. For this reason, when DTS-encoded software is played back through the analog outputs of the CD, LD, or DVD player, excessive noise will be exhibited. To avoid possible damage to the audio system, proper precautions should be taken by the customer if the analog outputs are connected directly to the receiver.
To enjoy DTS Digital Surround™ playback, a DTS-compatible player has to be connected to one of the digital inputs of the receiver.

System Setup

Please read the following new chapter after the "Positioning the Speakers" chapter in this section:

Receiver Adjustment

Once the number and position of loudspeakers has been fixed, you can adjust the initial receiver settings for optimal surround sound with the actual setup:

1 Set what speakers have been connected to the receiver *(see "Menus / Speaker Setup')*
Note: The initial setting of your receiver is:
two front speakers left and right: present (cannot be altered)
center speaker: present
two rear speakers: present
subwoofer: present

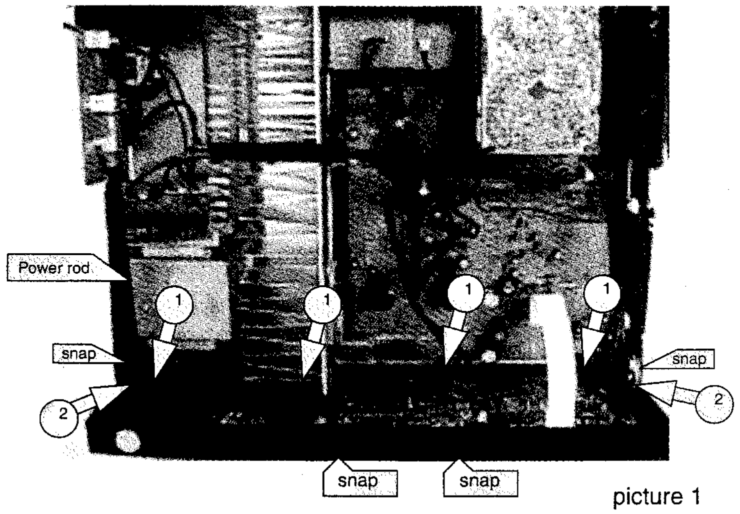
2 Select the size of the speakers (SMALL or LARGE) *(see "Menus: Speaker Sizes"*)
Select SMALL if your speaker is able to reproduce low notes down to at least 80–100 Hz.
Select LARGE if your speaker is able to reproduce low notes down to at least 50 Hz.
(As a rule of thumb, a LARGE speaker has a cone diameter of at least 12 cms (5 inches).)
See the specification sheets of your loudspeakers.
Note: The initial setting of your receiver is: all speakers set to LARGE.

3 Set the distance from the speakers to the listener's position *(see "Menus: Speaker Distance"*)
Note: The initial setting of your receiver is: all speakers set at a distance of 3 meters.

General note: Use the initial settings if you prefer that your receiver does not correct automatically for speaker sizes and distances.

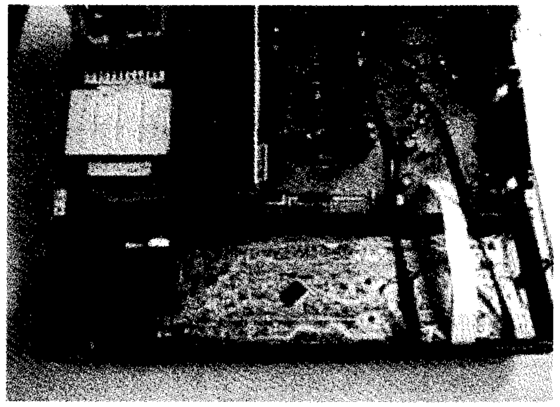
DISMANTLING HINTS

Dismantling of Front



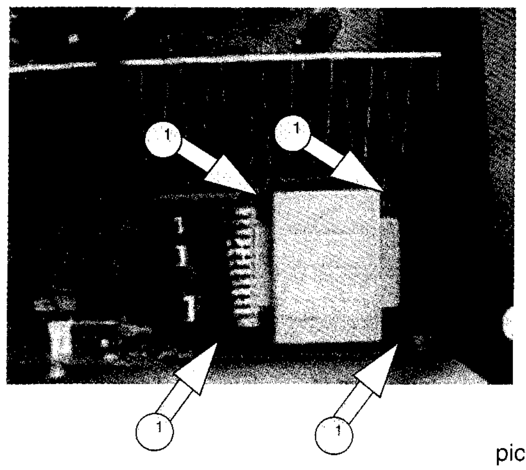
picture 1

1) Remove top cover
2) Remove power rod
3) Remove 6 x screw as shown in picture 1
4) Release two snaps (left & right side front)
5) Release two snaps on the bottom side front
6) Tipp down front as shown in picture 2



picture 2

Dismantling of mainstrafo

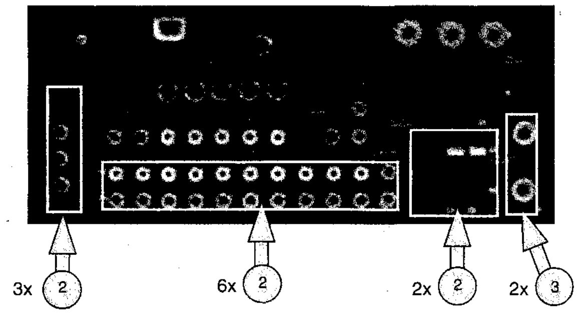


picture 8

1) Remove power rod
2) Remove 4x screw as shown in picture 8

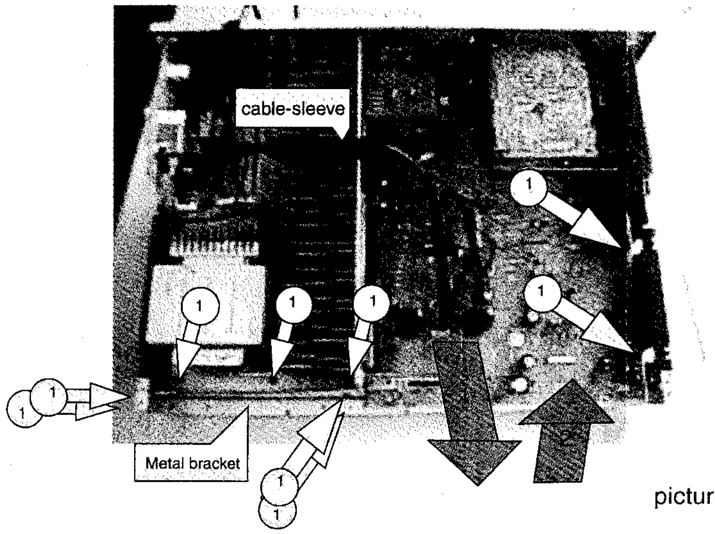
Dismantling of mono board

1) Remove front . See picture 1
2) Remove whole front (disconnect the wires on the mono board coming from front)



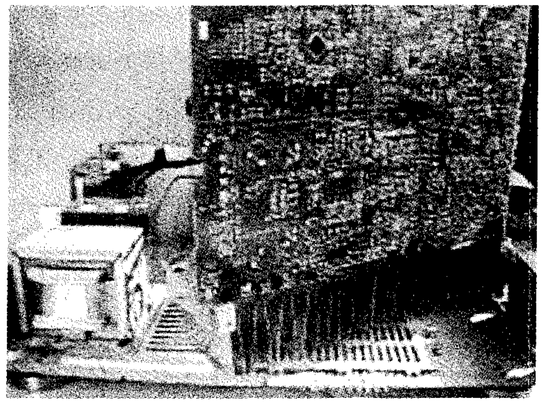
picture 3

3) Remove 13 x screws shown in mentionned aria . See picture 3



picture 4

4) Remove wires out the cable-sleeve.
5) Remove 7 x screw and remove metal bracket
6) Remove 2 x screw on mono board . See pictue 4
7) Remove mono board as shown arrow 1 & 2 . See picture 4
8) Bring the mono board in the service position as shown in picture 5



picture 5

Legend

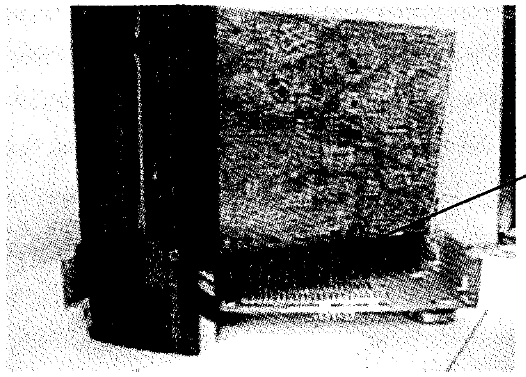
① = Torx M3x6mm (screw with big head)

② = Torx 3x10mm

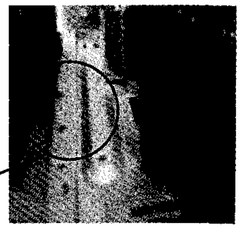
③ = Torx M3x6mm

Service position monoboard

1) Bring front in position as shown in picture 6
2) Snap nok of front in bottom to make front stable . See picture 7
3) Connect front wiring back to monoboard.
*The tuner module doesn't have to be connected. Use an other source (pe.CD)

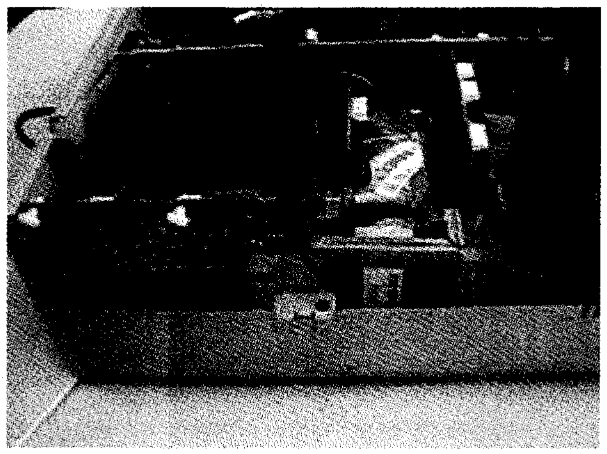


picture 6



picture 7

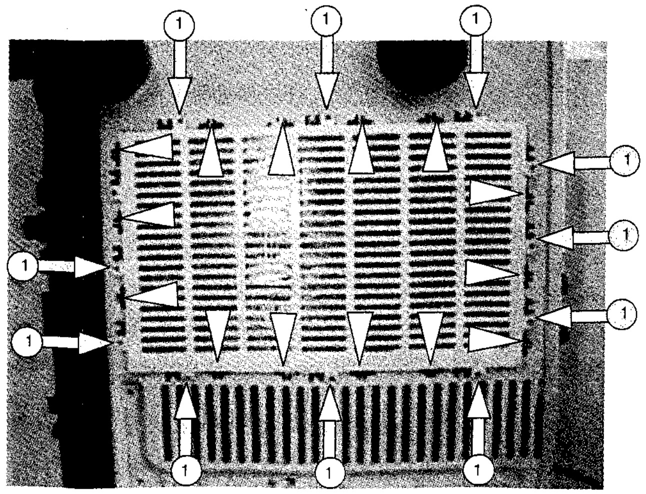
Service position main trafo



picture 9

1) Put main trafo as shown in picture 9

Handling service cover



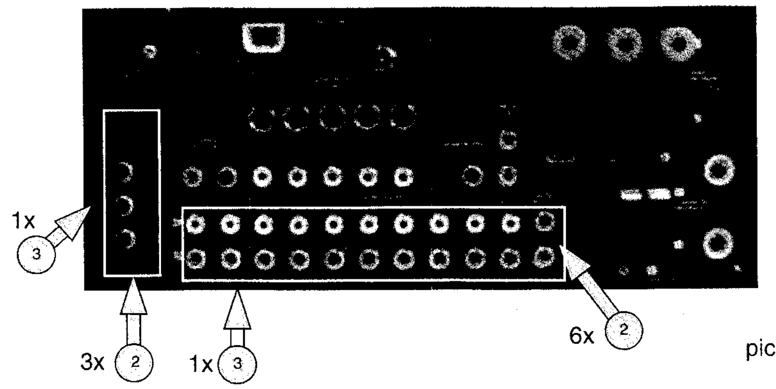
picture 10

1) To open the service cover cut 14 x lugs between cover and bottem . See picture 10 (▽)
2) To close the service cover put 11 x screw in mentionned holes. See picture 10
Service codenumber 12x Torx M3x6mm screw with big head = 4822 502 11659

DISMANTLING HINTS

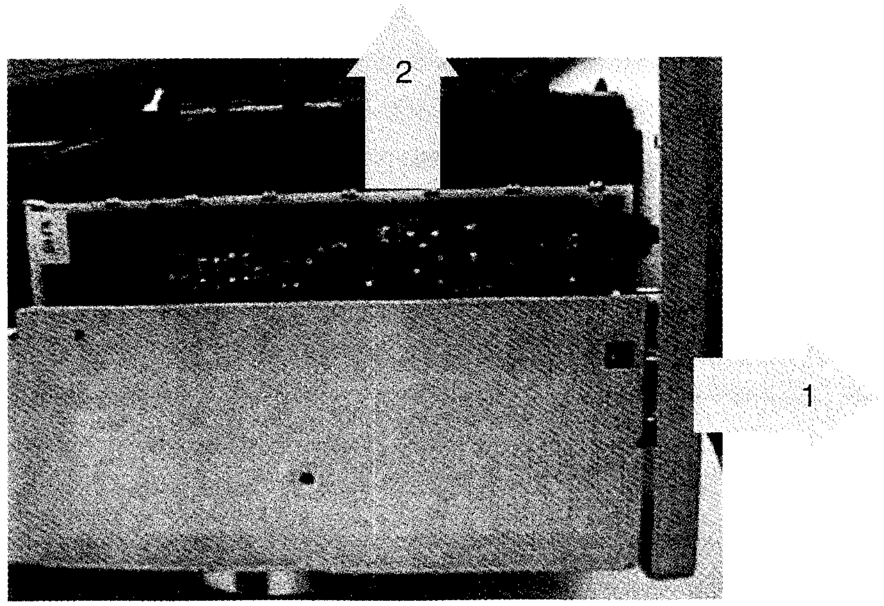
Dismantling of MDM module

1) Remove all the screws mentionned in the arial . See picture 11


1x ③
3x ②
1x ③
6x ②

picture11

2) Remove backplate a little backwards. See arrow 1 (picture 12)
3) Pull module out the set as shown in picture 12



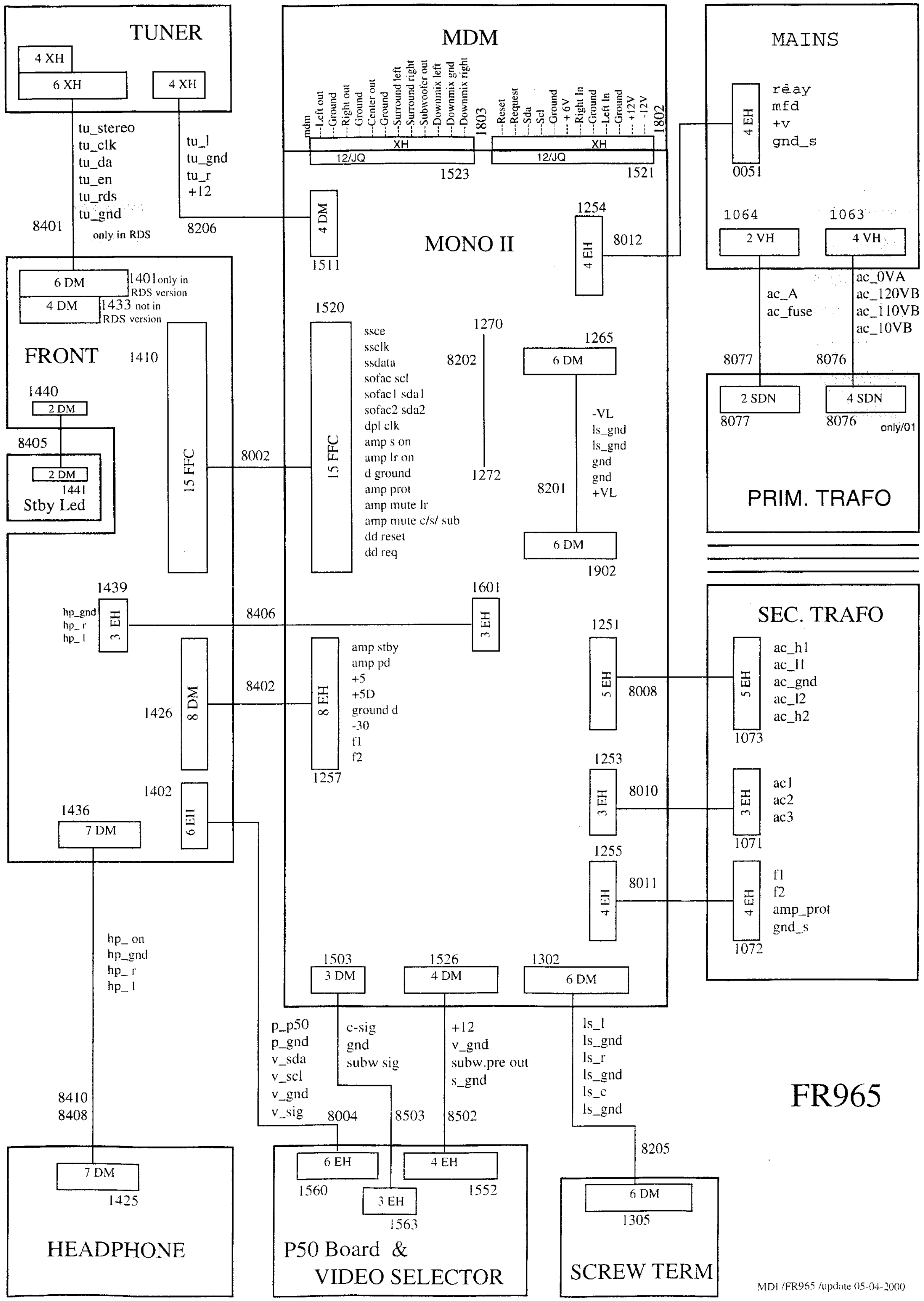
picture12

Legend

① = Torx M3x6mm (screw with big head)

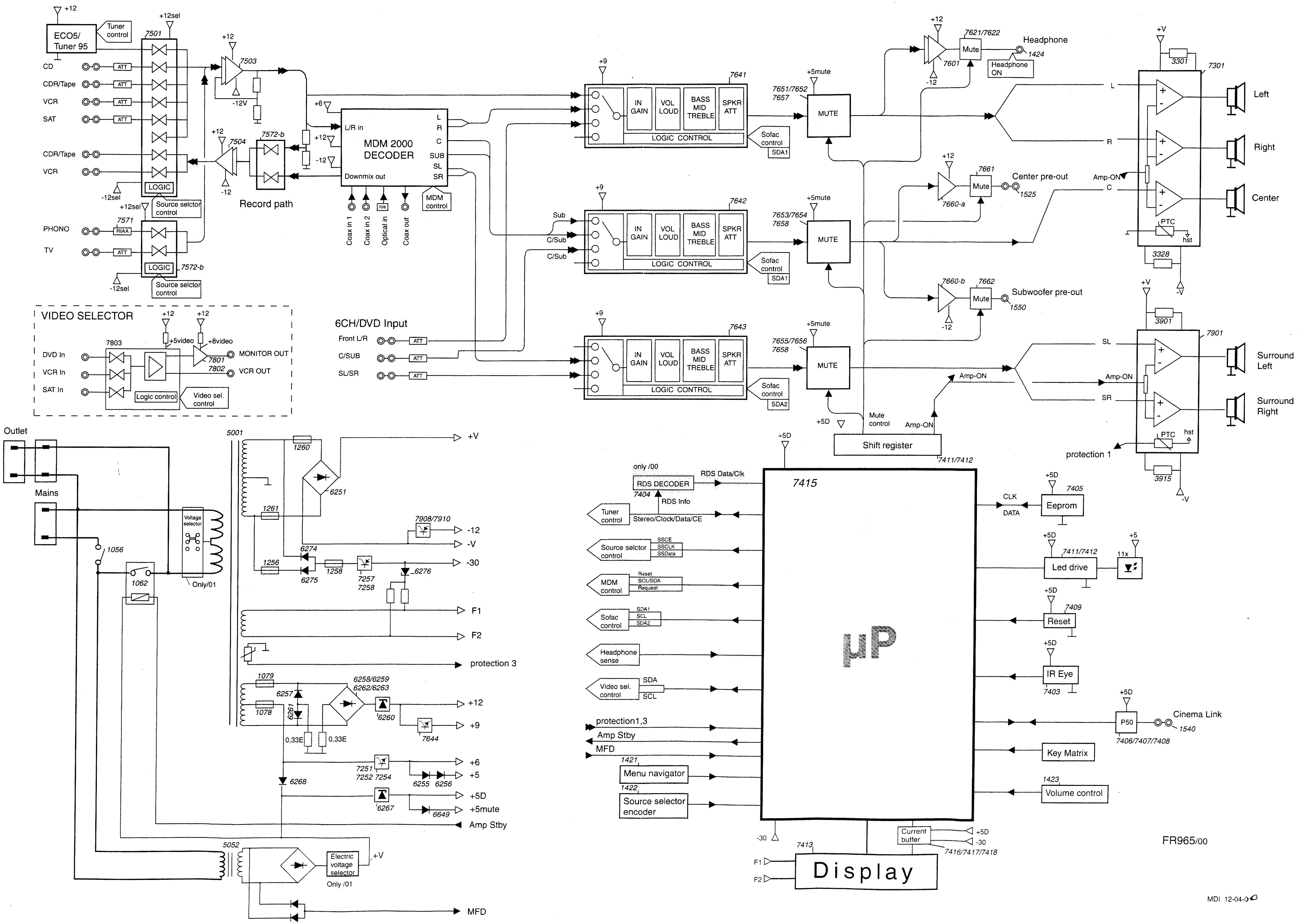
② = Torx 3x10mm   ③ = Torx M3x6mm

WIRING DIAGRAM


TUNER
4 XH
6 XH
4 XH
tu_stereo
tu_clk
tu_da
tu_en
tu_rds
tu_gnd
only in RDS
tu_l
tu_gnd
tu_r
+12
8401
8206
MDM
mdm
Left out
Ground
Right out
Ground
Center out
Ground
Surround left
Surround right
Subwoofer out
Downmix left
Downmix gnd
Downmix right
1803
Reset
Request
Sda
Scl
Ground
+ 6V
Right In
Ground
Left In
Ground
+12V
-12V
1802
XH
12/JQ
1523
XH
12/JQ
1521
MAINS
4 EH
relay
mfd
+v
gnd_s
0051
1064
1063
2 VH
4 VH
ac_A
ac_fuse
ac_0VA
ac_120VB
ac_110VB
ac_10VB
8077
8076
2 SDN
4 SDN
8077
8076
only/01
PRIM. TRAFO
4 DM
1511
MONO II
1254
4 EH
8012
FRONT
6 DM
1401 only in RDS version
4 DM
1433 not in RDS version
1410
1440
2 DM
8405
2 DM
1441
Stby Led
15 FFC
8002
1520
15 FFC
ssce
ssclk
ssdata
sofac scl
sofac1 sda1
sofac2 sda2
dpl clk
amp s on
amp lr on
d ground
amp prot
amp mute lr
amp mute c/s/ sub
dd reset
dd req
1270
8202
1272
1265
6 DM
-VL
ls_gnd
ls_gnd
gnd
gnd
+VL
8201
6 DM
1902
1439
hp_gnd
hp_ r
hp_ l
3 EH
8406
1601
3 EH
1426
8 DM
8402
8 EH
amp stby
amp pd
+5
+5D
ground d
-30
f1
f2
1257
1251
5 EH
8008
SEC. TRAFO
5 EH
ac_h1
ac_l1
ac_gnd
ac_l2
ac_h2
1073
1253
3 EH
8010
3 EH
ac1
ac2
ac3
1071
1255
4 EH
8011
4 EH
f1
f2
amp_prot
gnd_s
1072
1402
6 EH
1436
7 DM
hp_ on
hp_gnd
hp_ r
hp_ l
8410
8408
1503
3 DM
1526
4 DM
1302
6 DM
p_p50
p_gnd
v_sda
v_scl
v_gnd
v_sig
c-sig
gnd
subw sig
+12
v_gnd
subw.pre out
s_gnd
ls_l
ls_gnd
ls_r
ls_gnd
ls_c
ls_gnd
8004
8503
8502
8205
7 DM
1425
HEADPHONE
6 EH
1560
3 EH
1563
4 EH
1552
P50 Board &
VIDEO SELECTOR
6 DM
1305
SCREW TERM
FR965

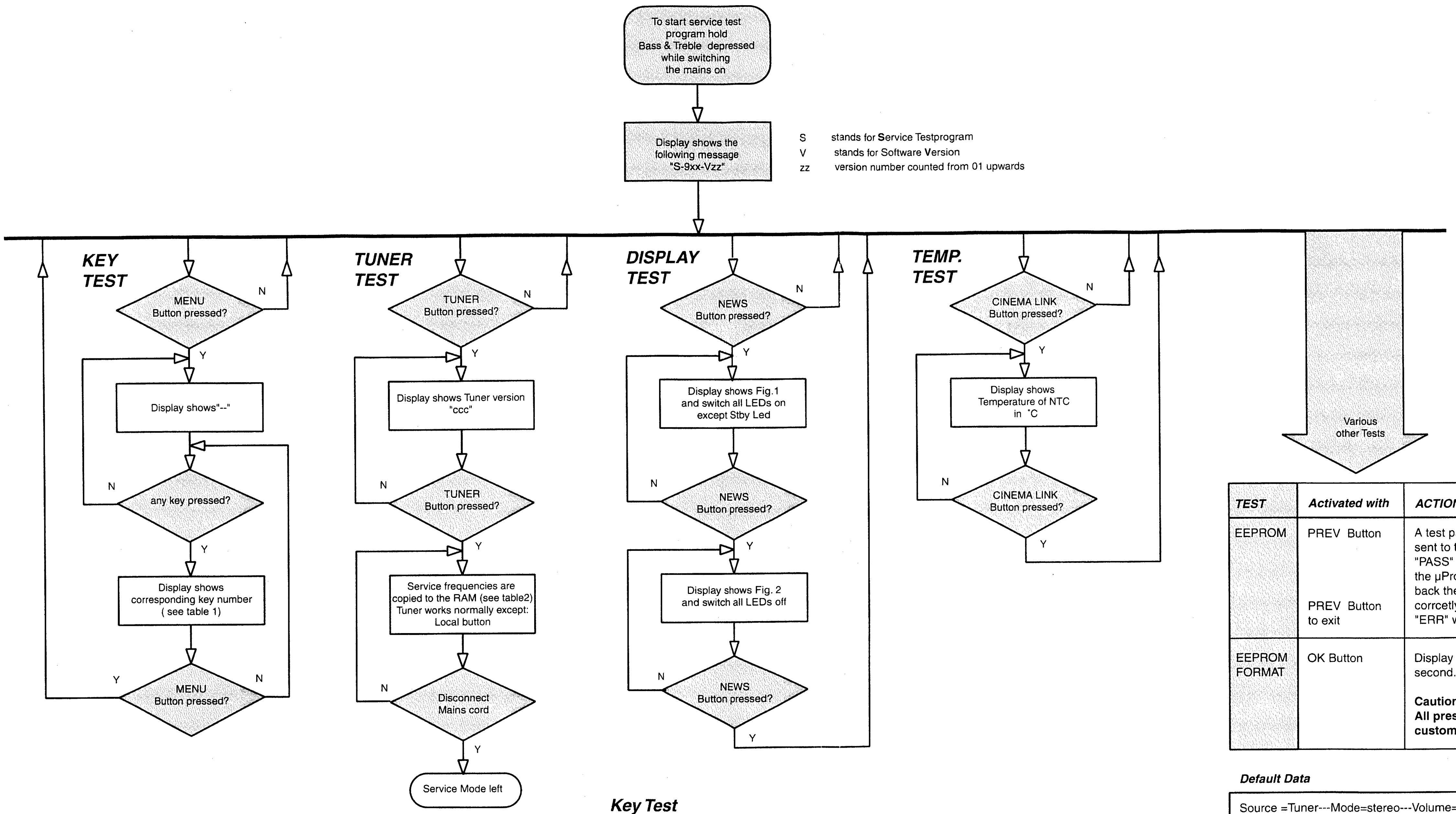
MDI /FR965 /update 05-04-2000

BLOCKDIAGRAM


+12
ECO5/ Tuner 95
Tuner control
+12sel
7501
CD
CDR/Tape
VCR
SAT
CDR/Tape
VCR
ATT
LOGIC
-12sel
+12sel
Source selctor control
7503
+12
-12V
7504
-12
7572-b
Record path
+6
+12
-12
L/R in
MDM 2000 DECODER
Downmix out
L
R
C
SUB
SL
SR
MDM control
Coax in 1
Coax in 2
Optical in
Coax out
PHONO
TV
7571
RIAA
7572-b
-12sel
VIDEO SELECTOR
7803
DVD In
VCR In
SAT In
+5video
+8video
7801
7802
MONITOR OUT
VCR OUT
Logic control
Video sel. control
6CH/DVD Input
Front L/R
C/SUB
SL/SR
+9
7641
7642
7643
IN GAIN
VOL LOUD
BASS MID TREBLE
SPKR ATT
LOGIC CONTROL
Sofac control
SDA1
SDA2
Sub
C/Sub
+5mute
7651/7652
7657
7653/7654
7658
7655/7656
7658
MUTE
7601
7621/7622
Mute
Headphone
1424
Headphone ON
7661
Center pre-out
1525
7660-a
7660-b
7662
Subwoofer pre-out
1550
+V
3301
7301
L
R
C
Amp-ON
PTC
hst
3328
-V
Left
Right
Center
3901
7901
SL
SR
Amp-ON
Surround Left
Surround Right
3915
protection 1
Mute control
Amp-ON
Shift register
7411/7412
+5D
Outlet
Mains
1056
1062
Voltage selector
Only/01
5001
1260
6251
1261
7908/7910
6274
1256
1258
6275
7257
7258
6276
+V
-12
-V
-30
F1
F2
protection 3
1079
1078
6257
6261
6258/6259
6262/6263
6260
7644
0,33E
0,33E
+12
+9
7251
7252 7254
6255 6256
6268
6267
6649
+6
+5
+5D
+5mute
Amp Stby
5052
Electric voltage selector
Only /01
MFD
only /00
RDS DECODER
7404
RDS Data/Clk
RDS Info
Tuner control
Stereo/Clock/Data/CE
Source selctor control
SSCE
SSCLK
SSData
MDM control
Reset
SCL/SDA
Request
Sofac control
SDA1
SCL
SDA2
Headphone sense
Video sel. control
SDA
SCL
protection1,3
Amp Stby
MFD
1421
Menu navigator
1422
Source selector encoder
7415
µP
CLK
DATA
7405
Eeprom
7411/7412
Led drive
11x
+5
7409
Reset
IR Eye
7403
P50
Cinema Link
1540
7406/7407/7408
Key Matrix
1423
Volume control
-30
7413
Current buffer
7416/7417/7418
F1
F2
Display

FR965/00

SERVICE TEST PROGRAM


To start service test program hold Bass & Treble depressed while switching the mains on
Display shows the following message "S-9xx-Vzz"
S stands for Service Testprogram
V stands for Software Version
zz version number counted from 01 upwards
KEY TEST
MENU Button pressed?
Display shows"--"
any key pressed?
Display shows corresponding key number (see table 1)
MENU Button pressed?
TUNER TEST
TUNER Button pressed?
Display shows Tuner version "ccc"
TUNER Button pressed?
Service frequencies are copied to the RAM (see table2) Tuner works normally except: Local button
Disconnect Mains cord
Service Mode left
DISPLAY TEST
NEWS Button pressed?
Display shows Fig.1 and switch all LEDs on except Stby Led
NEWS Button pressed?
Display shows Fig. 2 and switch all LEDs off
NEWS Button pressed?
TEMP. TEST
CINEMA LINK Button pressed?
Display shows Temperature of NTC in °C
CINEMA LINK Button pressed?
Various other Tests
Y
N

TEST	*Activated with*	*ACTION*
EEPROM	PREV Button PREV Button to exit	A test pattern will be sent to the Eeprom. "PASS" is displayed if the µProcessor read back the test pattern corrcetly, otherwise "ERR" will be displayed.
EEPROM FORMAT	OK Button	Display shows"NEW" for 1 second. **Caution! All presets from the customer will be Lost**

Default Data

Source =Tuner---Mode=stereo---Volume=10
Bass=0---Treble=0---Loudness=Off
#Effects: 3D Surr=100
#Volume balance:
Vol Front-L=0---Vol Front-R=0---Vol Center=0
Vol Rear-L=0---Vol Rear-R=0---Vol Subwoofer=0
#Speaker setup:
Subwoofer Present=Yes---Center=Yes---Rear=Yes
#Speaker Sizes:
Front Size=Large--- Center Size=Large---Rear Size=Large
#Speaker Distance:
Dist L/R=3meter---Dist Center=3meter---Dist Rear=3meter

Tuner Test

Display info Version	Europe "EUR" /00	East Eur. 3-band "EEL" /14	East Eur. 2-band "EEU" /14	USA "USA" /17	Oversea "OSE" /01
Preset 1	87.5MHz	65.81MHz	65.81MHz	87.5MHz	87.5MHz
2	108MHz	108MHz	108MHz	108MHz	108MHz
3	531kHz	74MHz	74MHz	530kHz	531kHz
4	1602kHz	87.5MHz	87.5MHz	1700kHz	1602kHz
5	558kHz	531kHz	531kHz	560kHz	558kHz
6	1494kHz	1602kHz	1602kHz	1500kHz	1494kHz
7	153kHz	558kHz	558kHz	98MHz	----
8	279kHz	1494kHz	1494kHz	----	----
9	198kHz	153kHz	98MHz	----	----
10	98MHz	279kHz	70.01MHz	----	----
11	----	198kHz	----	----	98MHz

Table 2

This table is valid for all types of tuners.
Custormer presets will not changed after this Tuner test.
If a station is tuned then the display flag "OK" will be ON otherwise it will be OFF.
If the tuned frequency is carrying RDS information, the display flag "RDS" will be ON.
Oversea version: the tuning grid can be switched between 9kHz and 10kHz by pressing the key "TUNER" for longer then 2 seconds. "Grid 9" or "Grid10" will be shown accordingly.
Grid 9kHz is in FM 50kHz , Grid 10kHz is in FM 100kHz
Europe version: the LW can be switched On and Off by pressing the key "TUNER" for longer than 2 seconds. LW OFF or LW ON will be shown accordingly.

Key Test

Key	Number	Key	Number	Key	Number
Cinema	1	Sens	7	Loudness	13
Surr. on/off	2	News T/A	8	Bass	14
Surr. Mode	3	Prev.Exit	9	Treble	15
Virt. Mode	4	Setup Menu	- -		
Tuner	5	Next	11		
Radio Text	6	Enter/OK	12		

Table 1

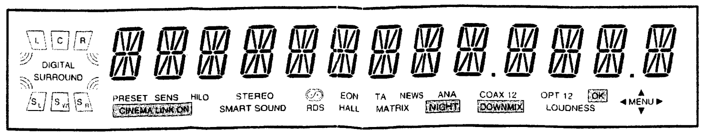

DIGITAL
SURROUND
PRESET SENS HI.LO
CINEMA LINK ON
STEREO
SMART SOUND
RDS
EON
HALL
TA NEWS ANA
MATRIX
NIGHT
COAX 12
DOWNMIX
OPT 12
OK
LOUDNESS
MENU

Figure 1

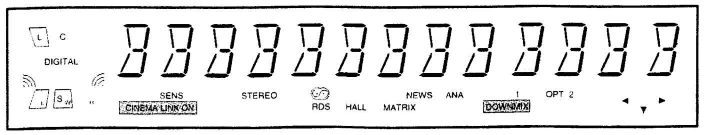
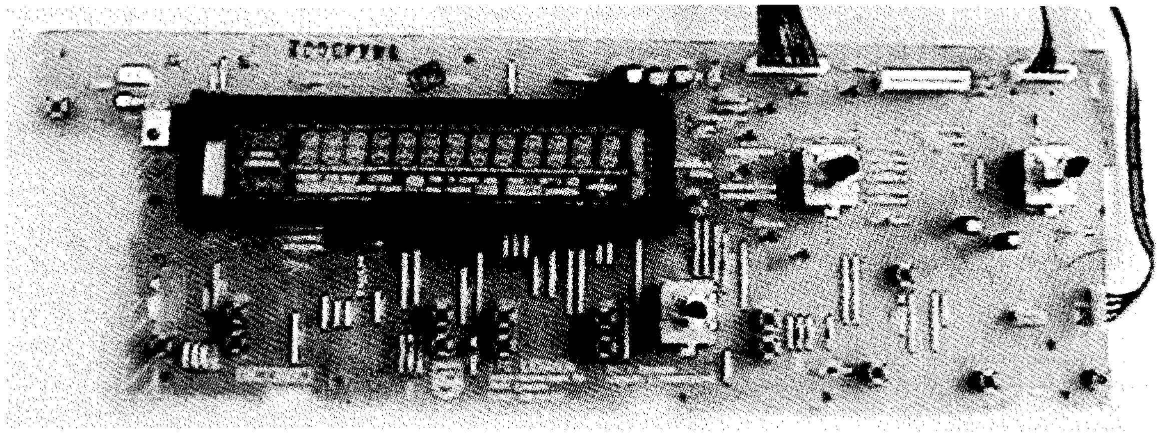

DIGITAL
SENS
CINEMA LINK ON
STEREO
RDS
HALL
NEWS ANA
MATRIX
DOWNMIX
OPT 2

Figure 2

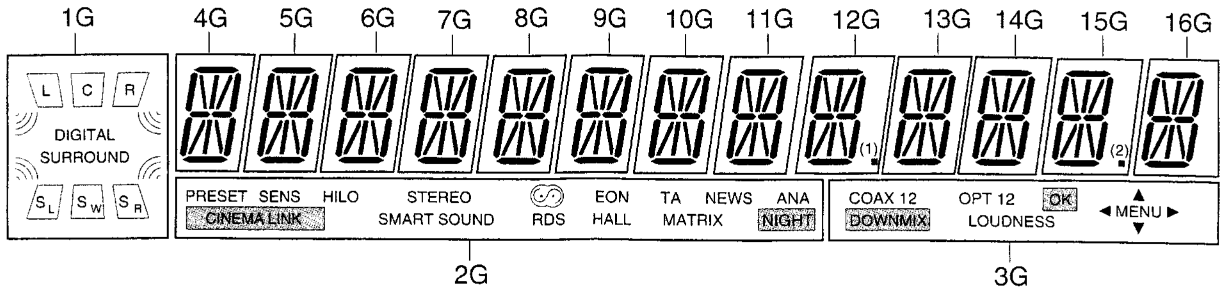


FRONT BOARD

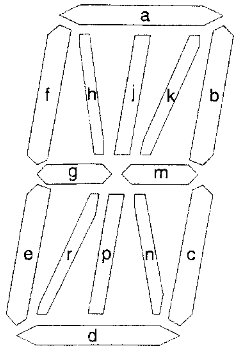
TABLE OF CONTENTS

FTD Display pin connections 6-2
Headphone & Led board layout 6-3
Circuit diagram 6-4
Component layout 6-5
Partslist 6-6

FTD DISPLAY PIN CONNECTIONS



1G
4G
5G
6G
7G
8G
9G
10G
11G
12G
13G
14G
15G
16G
L
C
R
DIGITAL
SURROUND
S L
S W
S R
(1)
(2)
PRESET
SENS
HILO
STEREO
EON
TA
NEWS
ANA
CINEMA LINK
SMART SOUND
RDS
HALL
MATRIX
NIGHT
COAX 12
OPT 12
OK
DOWNMIX
LOUDNESS
◄ MENU ►
2G
3G



a
f
h
i
k
b
g
m
e
r
p
n
c
d

	1G	2G	3G	4G~11G	12G	13G ,14G	15G	16G
P1	L	MATRIX	DOWNMIX	a	a	a	a	a
P2	R	NIGHT	COAX	j p	j p	j p	j p	j p
P3	C	ANA	1(coax)	h	h	h	h	h
P4	☐ (C)	LO	2(coax)	k	k	k	k	k
P5	▱ (S_L)	CINEMA LINK	OPT	b	b	b	b	b
P6	▱ (S_R)	EON	1(opt)	f	f	f	f	f
P7	S_W	HALL	2(opt)	m	m	m	m	m
P8	S (L)	HI	LOUDNESS	g	g	g	g	g
P9	L	NEWS	▼	c	c	c	c	c
P10	S (R)	PRESET	MENU	e	e	e	e	e
P11	R	RDS	▶	r	r	r	r	r
P12	))) (((	SMART SOUND	OK	n	n	n	n	n
P13	))) (((	STEREO	◀	d	d	d	d	d
P14	SURROUND	TA	▲	-	■ (1)	-	■ (2)	-
P15	DIGITAL	SENS	-	-	-	-	-	-

Pin Connection

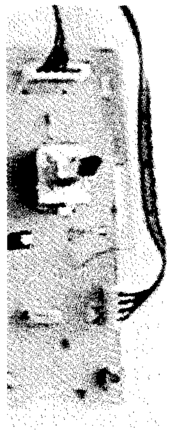
Pin numbers	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26
Connection	1G	2G	3G	4G	5G	6G	7G	8G	9G	10G	11G	12G	13G	14G	15G	16G	NC	NC	NC	NC	NC	NC	P15	P14	P13

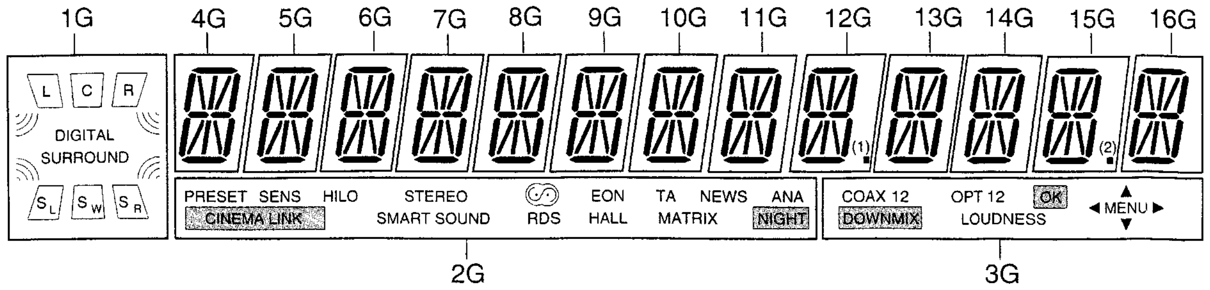
Pin numbers	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Connection	P12	P11	P10	P9	P8	P7	P6	P5	P4	P3	P2	P1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NP	NP	F1	F1

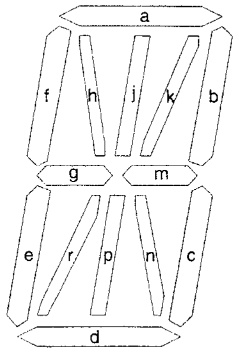
Pin numbers	62	61	60	59	58	57	56	55	54	53	52	51
Connection	F2	F2	NP	NP	NC	NC	NC	NC	NC	NC	NC	NC

Note: FI , F2 --------- Filament
NC -------------- No connection
NP -------------- No pin
1G ~ 16G ----- Grid

FTD DISPLAY PIN CONNECTIONS




1G
4G
5G
6G
7G
8G
9G
10G
11G
12G
13G
14G
15G
16G
L
C
R
DIGITAL
SURROUND
SL
SW
SR
PRESET
SENS
HILO
STEREO
EON
TA
NEWS
ANA
CINEMA LINK
SMART SOUND
RDS
HALL
MATRIX
NIGHT
(1)
COAX 12
OPT 12
OK
DOWNMIX
LOUDNESS
MENU
(2)
2G
3G


a
f
h
j
k
b
g
m
e
r
p
n
c
d

	1G	2G	3G	4G~11G	12G	13G ,14G	15G	16G
P1	L	MATRIX	DOWNMIX	a	a	a	a	a
P2	R	NIGHT	COAX	j p	j p	j p	j p	j p
P3	C	ANA	1(coax)	h	h	h	h	h
P4	(C)	LO	2(coax)	k	k	k	k	k
P5	(S_L)	CINEMA LINK	OPT	b	b	b	b	b
P6	(S_R)	EON	1(opt)	f	f	f	f	f
P7	S_W	HALL	2(opt)	m	m	m	m	m
P8	S (L)	HI	LOUDNESS	g	g	g	g	g
P9	L	NEWS	▼	c	c	c	c	c
P10	S (R)	PRESET	MENU	e	e	e	e	e
P11	R	RDS	▶	r	r	r	r	r
P12	))) (((	SMART SOUND	OK	n	n	n	n	n
P13	))) (((	STEREO	◀	d	d	d	d	d
P14	SURROUND	TA	▲	-	■ (1)	-	■ (2)	-
P15	DIGITAL	SENS	-	-	-	-	-	-

Pin Connection

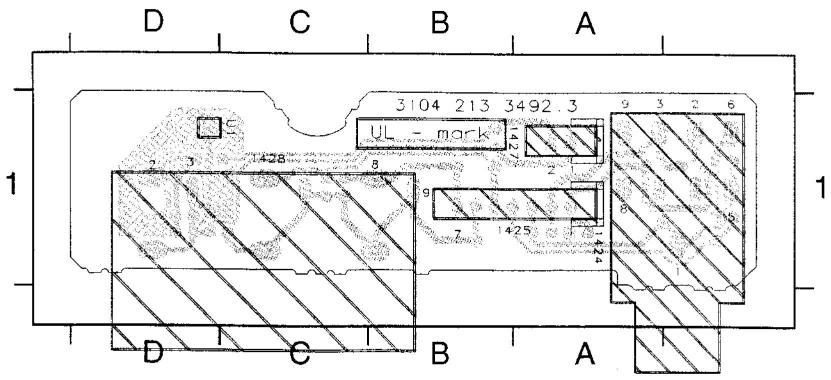
Pin numbers	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26
Connection	1G	2G	3G	4G	5G	6G	7G	8G	9G	10G	11G	12G	13G	14G	15G	16G	NC	NC	NC	NC	NC	NC	P15	P14	P13

Pin numbers	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Connection	P12	P11	P10	P9	P8	P7	P6	P5	P4	P3	P2	P1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NP	NP	F1	F1

Pin numbers	62	61	60	59	58	57	56	55	54	53	52	51
Connection	F2	F2	NP	NP	NC	NC	NC	NC	NC	NC	NC	NC

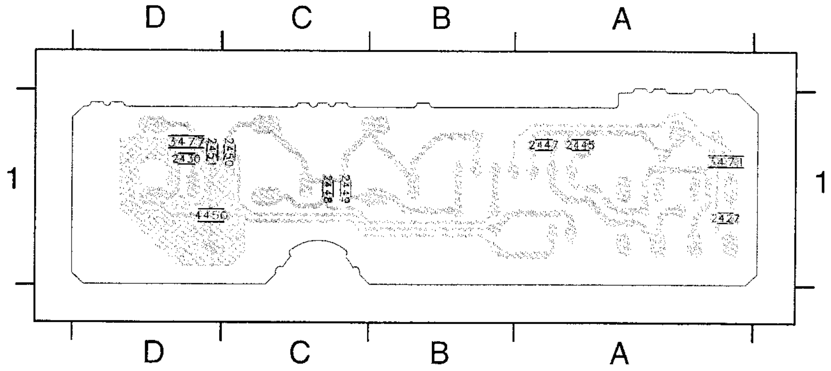
Note: FI , F2 --------- Filament
NC -------------- No connection
NP -------------- No pin
1G ~ 16G ----- Grid

HEADPHONE BOARD - COMPONENT VIEW


D
C
B
A
1
3104 213 3492.3
UL - mark
1428
1427
1425
1424
D
C
B
A

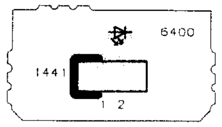
U1 C1
1424 A1
1425 A1
1427 A1
1428 C1

HEADPHONE BOARD - COPPER SIDE VIEW

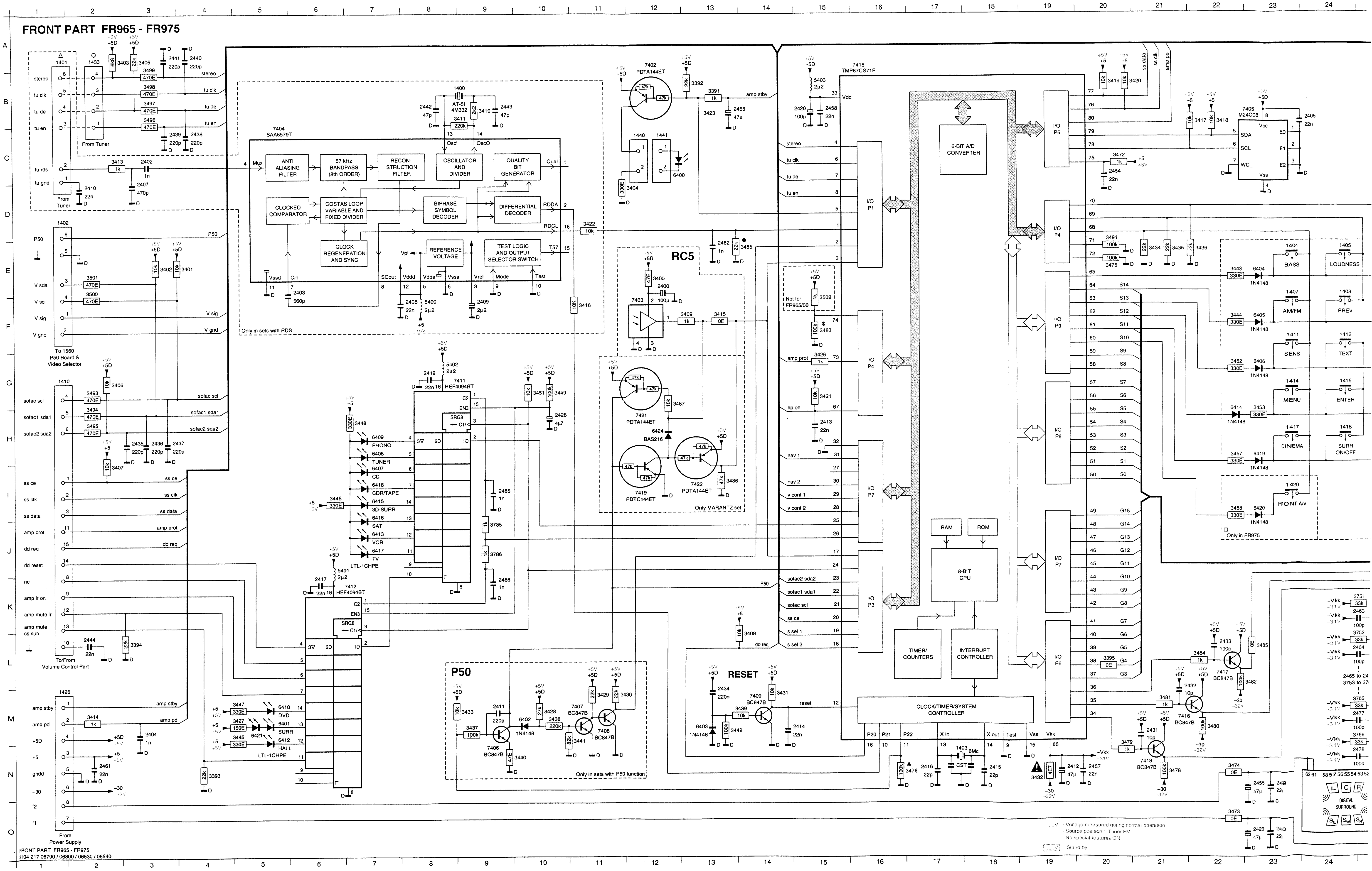


2427 A1
2430 D1
2445 A1
2447 A1
2448 C1
2449 C1
2450 C1
2451 D1
3471 A1
3477 D1
4450 D1

LED BOARD - COMPONENT VIEW


6400
1441
1 2

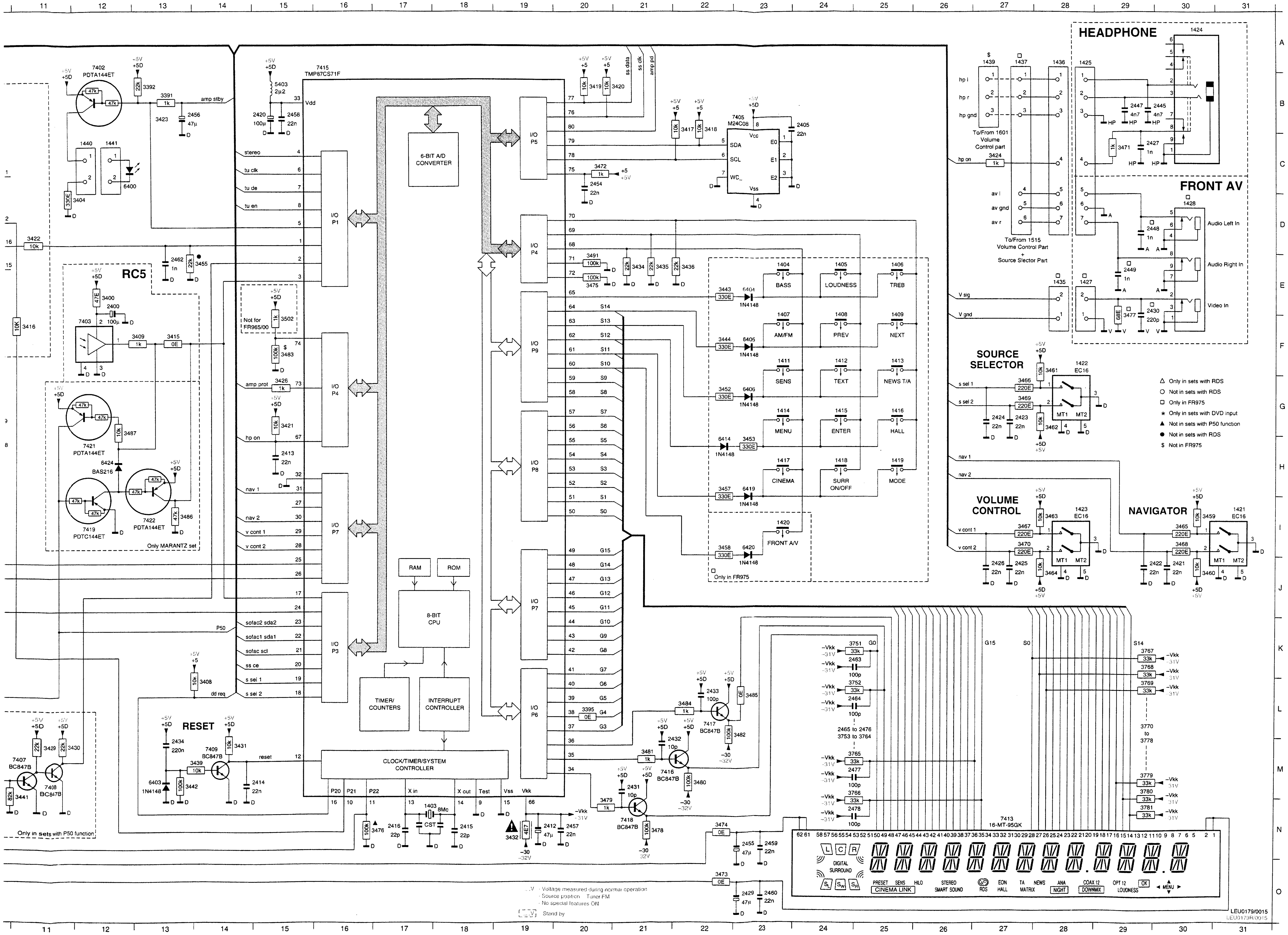
FRONT PART FR965 - FR975


7404 SAA6579T
ANTI ALIASING FILTER
57 kHz BANDPASS (8th ORDER)
RECON-STRUCTION FILTER
OSCILLATOR AND DIVIDER
QUALITY BIT GENERATOR
CLOCKED COMPARATOR
COSTAS LOOP VARIABLE AND FIXED DIVIDER
BIPHASE SYMBOL DECODER
DIFFERENTIAL DECODER
CLOCK REGENERATION AND SYNC
REFERENCE VOLTAGE
TEST LOGIC AND OUTPUT SELECTOR SWITCH
1400 AT-51 4M332
Only in sets with RDS
1401
1433
From Tuner
stereo
tu clk
tu de
tu en
tu rds
tu gnd
1402
P50
V sda
V scl
V sig
V gnd
To 1560 P50 Board & Video Selector
1410
sofac scl
sofac1 sda1
sofac2 sda2
ss ce
ss clk
ss data
amp prot
dd req
dd reset
nc
amp lr on
amp mute lr
amp mute cs sub
To/From Volume Control Part
1426
amp stby
amp pd
+5D
+5
gndd
-30
f2
f1
From Power Supply
7402 PDTA144ET
1440
1441
6400
7411 HEF4094BT
7412 HEF4094BT
SRG8
6409 PHONO
6408 TUNER
6407 CD
6418 CDR/TAPE
6415 3D-SURR
6416 SAT
6413 VCR
6417 TV
LTL-1CHPE
6410 DVD
6401 SURR
6412 HALL
RC5
7403
Not for FR965/00
7421 PDTA144ET
6424 BAS216
7419 PDTC144ET
7422 PDTA144ET
Only MARANTZ set
P50
7406 BC847B
7407 BC847B
7408 BC847B
6402 1N4148
Only in sets with P50 function
RESET
7409 BC847B
6403 1N4148
7415 TMP87CS71F
6-BIT A/D CONVERTER
I/O P1
I/O P2
I/O P3
I/O P4
I/O P5
I/O P6
I/O P7
I/O P8
I/O P9
RAM
ROM
8-BIT CPU
TIMER/ COUNTERS
INTERRUPT CONTROLLER
CLOCK/TIMER/SYSTEM CONTROLLER
1403 8Mc CST
7405 M24C08
1404 BASS
1405 LOUDNESS
1407 AM/FM
1408 PREV
1411 SENS
1412 TEXT
1414 MENU
1415 ENTER
1417 CINEMA
1418 SURR ON/OFF
1420 FRONT A/V
Only in FR975
7416 BC847B
7417 BC847B
7418 BC847B
-Vkk
DIGITAL SURROUND

...V - Voltage measured during normal operation
- Source position: Tuner FM
- No special features ON

Stand by

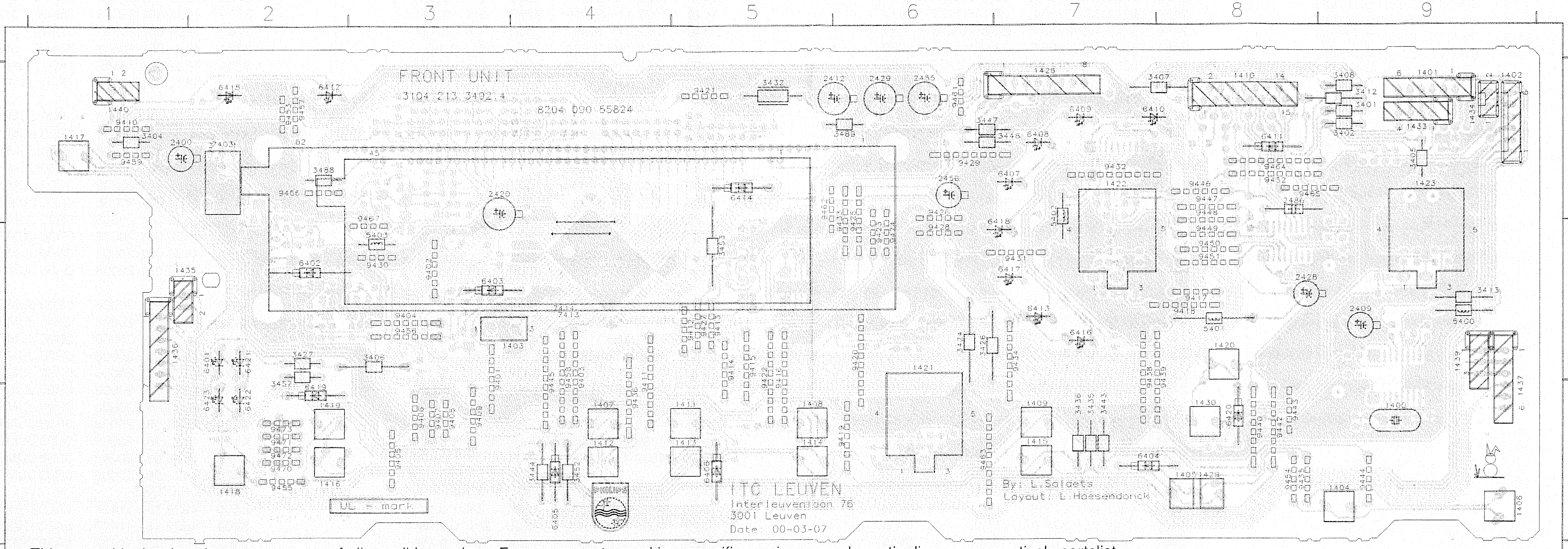
FRONT PART FR965 - FR975
3104 217 06790 / 06800 / 06530 / 06540


HEADPHONE
FRONT AV
RC5
RESET
SOURCE SELECTOR
VOLUME CONTROL
NAVIGATOR
7415 TMP87CS71F
6-BIT A/D CONVERTER
8-BIT CPU
RAM
ROM
TIMER/ COUNTERS
INTERRUPT CONTROLLER
CLOCK/TIMER/SYSTEM CONTROLLER
7405 M24C08
7413 16-MT-95GK
7402 PDTA144ET
7421 PDTA144ET
7422 PDTA144ET
7419 PDTC144ET
7407 BC847B
7408 BC847B
7409 BC847B
7416 BC847B
7417 BC847B
7418 BC847B
BASS
LOUDNESS
TREB
AM/FM
PREV
NEXT
SENS
TEXT
NEWS T/A
MENU
ENTER
HALL
CINEMA
SURR ON/OFF
MODE
FRONT A/V
Only in FR975
Not for FR965/00
Only MARANTZ set
Only in sets with P50 function
To/From 1601 Volume Control part
To/From 1515 Volume Control Part + Source Sector Part
Audio Left In
Audio Right In
Video In
△ Only in sets with RDS
○ Not in sets with RDS
□ Only in FR975
★ Only in sets with DVD input
▲ Not in sets with P50 function
● Not in sets with RDS
$ Not in FR975
_V_ : Voltage measured during normal operation
- Source position : Tuner FM
- No special features ON
(_V_) Stand by
LEU0179/0015
LEU0179R/0015

1400	B8	3418	B22	7404	C5
1401	A1	3419	B20	7405	B22
1402	D1	3420	B20	7406	N9
1403	N17	3421	G15	7407	M11
1404	E23	3422	D11	7408	M11
1405	E24	3423	B13	7409	M14
1406	E25	3424	C27	7411	G8
1407	F23	3426	G15	7412	K6
1408	F24	3427	M4	7413	N27
1409	F25	3428	M10	7415	A16
1410	G1	3429	M11	7416	M21
1411	F23	3430	M11	7417	L22
1412	F24	3431	M14	7418	N21
1413	F25	3432	N19	7419	I12
1414	G23	3433	M9	7421	H12
1415	G24	3434	E21	7422	I13
1416	G25	3435	E21		
1417	H23	3436	E22		
1418	H24	3437	M9		
1419	H25	3438	M10		
1420	I23	3439	M13		
1421	I31	3440	N10		
1422	F28	3441	N11		
1423	I28	3442	M13		
1424	A30	3443	E22		
1425	A28	3444	F22		
1426	M1	3445	I6		
1427	E28	3446	M4		
1428	D30	3447	M4		
1433	A2	3448	H7		
1435	E28	3449	G10		
1436	A28	3451	G10		
1437	A27	3452	G22		
1439	A27	3453	H23		
1440	C12	3455	E14		
1441	C12	3457	H22		
2400	E12	3458	I22		
2402	C3	3459	I30		
2403	E6	3460	J30		
2404	M3	3461	F28		
2405	B24	3462	G28		
2407	D3	3463	I28		
2408	F8	3464	J28		
2409	F9	3465	I30		
2410	D2	3466	G27		
2411	M9	3467	I27		
2412	N19	3468	I30		
2413	H15	3469	G27		
2414	M14	3470	I27		
2415	N18	3471	C29		
2416	N17	3472	C20		
2417	K6	3473	O22		
2419	G8	3474	N22		
2420	B15	3475	E20		
2421	J30	3476	N16		
2422	J29	3477	F29		
2423	G27	3478	N21		
2424	G27	3479	N20		
2425	J27	3480	M22		
2426	J27	3481	M21		
2427	C29	3482	L23		
2428	H10	3483	F15		
2429	O23	3484	L22		
2430	E29	3485	L23		
2431	M21	3486	I13		
2432	M21	3487	G12		
2433	L22	3491	E20		
2434	M13	3493	G2		
2435	H3	3494	H2		
2436	H3	3495	H2		
2437	H3	3496	B3		
2438	C4	3497	B3		
2439	C3	3498	B3		
2440	A4	3499	A3		
2441	A3	3500	E2		
2442	B8	3501	E2		
2443	B9	3502	F15		
2444	L2	3751	K24		
2445	B29	3752	L24		
2447	B29	3753	M24		
2448	D29	3764	M25		
2449	E29	3765	M24		
2454	C20	3766	M24		
2455	N23	3767	K29		
2456	B13	3768	K29		
2457	N20	3769	L29		
2458	B15	3770	L29		
2459	N23	3778	M29		
2460	O23	3779	M29		
2461	N2	3780	M29		
2462	E13	3781	N29		
2463	K24	3785	J9		
2464	L24	3786	J9		
2465	L24	5400	F8		
2476	L25	5401	J6		
2477	M24	5402	G8		
2478	N24	5403	B15		
2485	I9	6400	C12		
2486	K9	6401	M5		
3391	B13	6402	M10		
3392	B13	6403	M13		
3393	N4	6404	E23		
3394	L3	6405	F23		
3395	L20	6406	G23		
3400	E12	6407	I7		
3401	E4	6408	H7		
3402	E3	6409	H7		
3403	A2	6410	M5		
3404	D12	6412	M5		
3405	A3	6413	J7		
3406	G2	6414	H22		
3407	I2	6415	I7		
3408	L14	6416	I7		
3409	F12	6417	J7		
3410	B9	6418	I7		
3411	B8	6419	H23		
3413	C2	6420	I23		
3414	M2	6421	M5		
3415	F13	6424	H12		
3416	F11	7402	A12		
3417	B22	7403	F12		

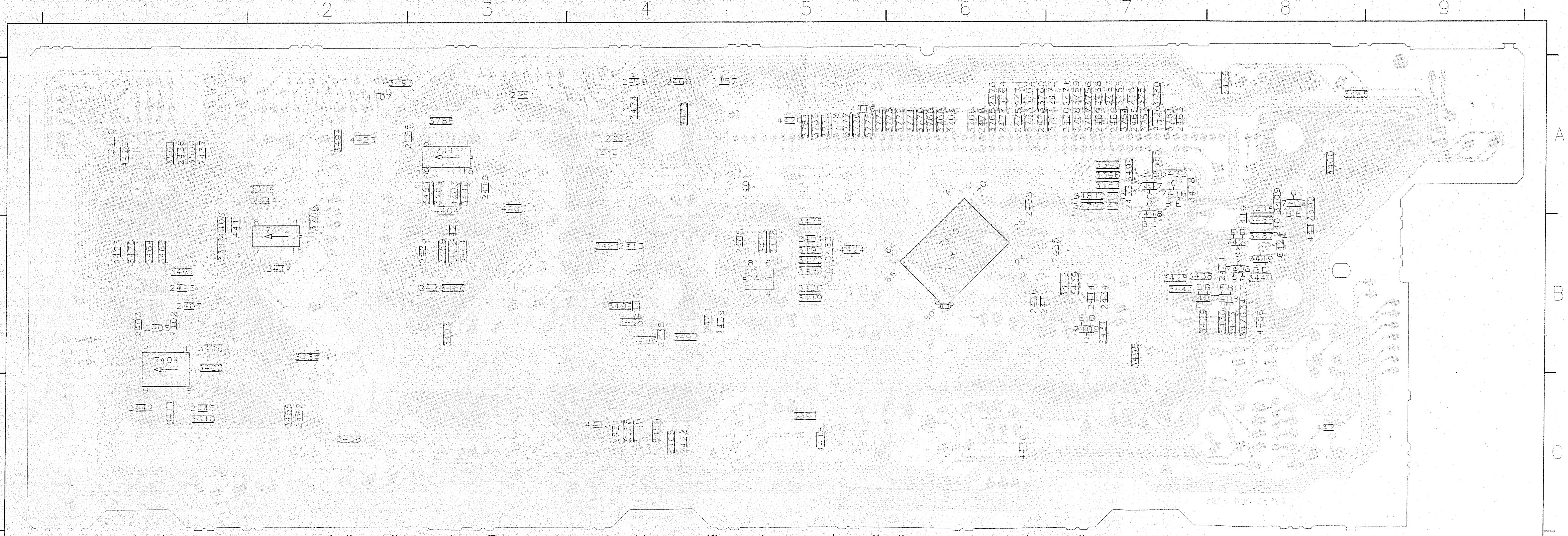
FRONT BOARD - COMPONENT & COPPER SIDE VIEW

1400	C9
1401	A9
1402	A9
1403	B3
1404	C9
1405	C8
1406	C9
1407	C4
1408	C5
1409	C7
1410	A8
1411	C5
1412	C4
1413	C5
1414	C5
1415	C7
1416	C2
1417	A1
1418	C2
1419	C2
1420	B8
1421	C6
1422	B7
1423	B9
1426	A7
1429	C8
1430	C8
1433	A9
1434	A9
1435	B1
1436	B1
1437	B9
1439	B9
1440	A1
2400	A1
2409	B9
2412	A6
2420	A3
2428	B8
2429	A6
2455	A6
2456	A6
2486	A8
3401	A9
3402	A9
3404	A1
3405	A9
3406	B3
3407	A8
3408	A9
3412	A9
3413	B9
3424	B6
3426	B6
3427	B2
3432	A5
3435	C7
3436	C7
3443	C7
3444	C4
3447	A6
3448	A6
3452	C4
3453	B5
3457	B2
3488	A2
3489	A6
5400	B9
5401	B8
5402	A7
5403	B3
6401	B2
6402	B2
6403	B3
6404	C7
6405	C4
6406	C5
6407	A7
6408	A7
6409	A7
6410	A7
6411	A8
6412	A2
6413	B7
6414	A5
6415	A2
6416	B7
6417	B7
6418	B7
6419	C2
6420	C8
6421	B2
6422	C2
6423	C2
7403	A2
7413	A4
7414	A4
9401	B3
9402	B3
9403	B4
9404	B3
9405	C3
9406	C3
9407	C3
9408	C3
9409	C3
9410	A1
9411	B4
9412	B5
9413	B5
9414	B5
9415	B5
9416	B5
9417	B8
9418	B8
9419	C6
9420	B6
9421	A5
9422	B5
9423	B6
9424	B6
9425	A6
9426	A6
9427	B5
9428	B6
9429	A6
9430	B3
9431	B7
9432	A7
9433	A6
9434	B7
9435	C8
9436	C4
9438	B7
9439	B7
9440	C8
9442	C8
9443	C8
9444	C9
9445	B4
9446	A8
9447	A8
9448	B8
9449	B8
9450	B8
9451	B8
9452	A8
9453	A2
9454	C8
9455	C2
9456	B3
9457	A2
9458	B4
9459	A1
9461	A6
9462	A5
9463	C6
9464	A8
9465	A8
9466	A2
9467	B3
9470	C2
9471	C2
9472	C2
9473	C2



This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram respectively partslist.

2401	B8
2402	B1
2403	B1
2404	A4
2405	B5
2407	B1
2408	B1
2410	A1
2411	B8
2413	B4
2414	B7
2415	B6
2416	B6
2417	B2
2419	A3
2421	C4
2422	C4
2423	B3
2424	B3
2425	B1
2426	B1
2431	A7
2432	A7
2433	A7
2434	B7
2435	B7
2436	A1
2437	A1
2438	B4
2439	B4
2440	B4
2441	B4
2442	C1
2443	C1
2444	A2
2454	B5
2457	A4
2458	A6
2459	A4
2460	A4
2461	A3
2462	C2
2463	A7
2464	A7
2465	A7
2466	A7
2467	A7
2468	A7
2469	A7
2470	A7
2471	A7
2472	A7
2473	A6
2474	A6
2475	A6
2476	A6
2477	A6
2478	A6
2485	A3
3391	C5
3392	A8
3393	B1
3394	A2
3395	A7
3396	A7
3400	A8
3403	B3
3409	A8
3410	C1
3411	C1
3414	A4
3415	A8
3416	B1
3417	B5
3418	B5
3419	B5
3420	B5
3421	B4
3422	B1
3428	B7
3429	B7
3430	B8
3431	B7
3433	B8
3434	B2
3437	B8
3438	B7
3439	B7
3440	B8
3441	B7
3442	B7
3445	A8
3446	A8
3449	A3
3451	A3
3454	A3
3455	C2
3458	C2
3459	C4
3460	C4
3461	B3
3462	B3
3463	B1
3464	B1
3465	C4
3466	B3
3467	B1
3468	C4
3469	B3
3470	B1
3472	B5
3473	A4
3474	A4
3475	B5
3476	B8
3478	A7
3479	A7
3480	A7
3481	A7
3482	A7
3483	B5
3484	A7
3485	A7
3486	B8
3487	B8
3490	A7
3491	B5
3492	B5
3493	A2
3494	A2
3495	B7
3496	B4
3497	B4
3498	B4
3499	B4
3500	A1
3501	A1
3502	B5
3751	A7
3752	A7
3753	A7
3754	A7
3755	A7
3756	A7
3757	A7
3758	A7
3759	A7
3760	A6
3761	A7
3762	A6
3763	A6
3764	A6
3765	A6
3766	A6
3767	A6
3768	A6
3769	A6
3770	A6
3771	A6
3772	A6
3773	A6
3774	A5
3775	A5
3776	A5
3777	A5
3778	A5
3779	A5
3780	A5
3781	A5
3785	A3
3786	B2
4401	A5
4402	A3
4403	A3
4404	A3
4406	B8
4407	A2
4408	B1
4410	C6
4411	B1
4413	C4
4416	A5
4417	B8
4418	C5
4419	B8
4420	A5
4421	C8
4422	A1
4423	A2
4424	B5
4425	B3
4426	A7
6424	B8
7402	A8
7404	B1
7405	B5
7406	B8
7407	B7
7408	B8
7409	B7
7411	A3
7412	B2
7415	B6
7416	A7
7417	A7
7418	B7
7419	B8
7421	B8
F400	A1
F401	A1
F402	A1
F403	A1
F404	A1
F405	A1
F406	A1
F407	A1
F408	A2
F409	A2
F410	A2
F411	A2
F412	A2
F413	A2
F414	A2
F415	A2
F416	A2
F417	B1
F421	A2
F422	A2
F423	A2
F424	A2
F425	A2
F426	B7
F427	A4
F428	A3
F429	A4
F430	A3
F431	A3
F432	A3
F433	A4
F434	A4
F435	C5
F436	C5
F437	C8
F438	C2
F439	C5
F440	C5
F441	C7
F442	C8
F443	B2
F453	A5
F454	A1
F455	C8
F456	C8
F457	C8
F458	C8
F459	C8
F460	B7
F461	B7
F463	A2



This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram respectively partslist.

ELECTRICAL PARTSLIST - FRONT BOARD

MISCELLANEOUS

1400	4822 242 11033	CRYSTAL (4,332MH)
1403	4822 242 72066	CST8,00MT
1404	4822 276 13114	SWITCH, PUSH BUTTON
1405	4822 276 13114	SWITCH, PUSH BUTTON
1406	4822 276 13114	SWITCH, PUSH BUTTON
1407	4822 276 13114	SWITCH, PUSH BUTTON
1408	4822 276 13114	SWITCH, PUSH BUTTON
1409	4822 276 13114	SWITCH, PUSH BUTTON
1410	4822 265 10981	15FE-BT-VK-N
1411	4822 276 13114	SWITCH, PUSH BUTTON
1412	4822 276 13114	SWITCH, PUSH BUTTON
1413	4822 276 13114	SWITCH, PUSH BUTTON
1414	4822 276 13114	SWITCH, PUSH BUTTON
1415	4822 276 13114	SWITCH, PUSH BUTTON
1416	4822 276 13114	SWITCH, PUSH BUTTON
1417	4822 276 13114	SWITCH, PUSH BUTTON
1418	4822 276 13114	SWITCH, PUSH BUTTON
1419	4822 276 13114	SWITCH, PUSH BUTTON
1420	4822 276 13114	SWITCH, PUSH BUTTON
1421	4822 273 10372	SWITCH, ROTARY
1422	4822 273 10372	SWITCH, ROTARY
1423	4822 273 10365	ROTARY ENCODER 24P
1424	4822 265 11584	1P YKB21-5209
1428	4822 265 11336	3P. FEM. CINCH
8002	4822 320 12706	FLEXIBLE FOIL 15P 220MM

CAPACITORS

2400	4822 124 41584	100UF 20% 10V
2402	5322 122 31647	1NF10%X7R 63V
2403	5322 116 80853	560PF 5%NP0 63V
2404	5322 122 31647	1NF10%X7R 63V
2405	5322 122 32654	22NF10%X7R 63V
2407	5322 122 34099	470PF10%X7R 63V
2408	5322 122 32654	22NF10%X7R 63V
2409	4822 124 22652	2,2UF20% 50V
2410	5322 122 32654	22NF10%X7R 63V
2411	4822 122 33575	220PF 5% NP0 63V
2412	4822 124 41751	47UF 20% 50V
2413	5322 122 32654	22NF10%X7R 63V
2414	5322 122 32654	22NF10%X7R 63V
2415	5322 122 32658	22PF 5% 50V
2416	5322 122 32658	22PF 5% 50V
2417	5322 122 32654	22NF10%X7R 63V
2419	5322 122 32654	22NF10%X7R 63V
2420	4822 124 23432	100UF20% 10V
2421	5322 122 32654	22NF10%X7R 63V
2422	5322 122 32654	22NF10%X7R 63V
2423	5322 122 32654	22NF10%X7R 63V
2424	5322 122 32654	22NF10%X7R 63V
2425	5322 122 32654	22NF10%X7R 63V
2426	5322 122 32654	22NF10%X7R 63V
2427	5322 122 31647	1NF10%X7R 63V
2428	4822 124 40769	4,7UF20% 100V
2429	4822 124 41751	47UF 20% 50V
2430	4822 122 33575	220PF 5% NP0 63V
2431	5322 122 32531	100PF 5%NP0 50V
2432	5322 122 32531	100PF 5%NP0 50V
2433	5322 122 32531	100PF 5%NP0 50V
2434	4822 126 14076	220N 25V. P8020
2435	4822 122 33575	220PF 5% NP0 63V
2436	4822 122 33575	220PF 5% NP0 63V
2437	4822 122 33575	220PF 5% NP0 63V
2438	4822 122 33575	220PF 5% NP0 63V
2439	4822 122 33575	220PF 5% NP0 63V
2440	4822 122 33575	220PF 5% NP0 63V
2441	4822 122 33575	220PF 5% NP0 63V
2442	4822 126 13692	47PF 1% NP0 63V
2443	4822 126 13692	47PF 1% NP0 63V
2444	5322 122 32654	22NF10%X7R 63V
2445	5322 126 10223	4,7NF10%X7R 63V
2447	5322 126 10223	4,7NF10%X7R 63V
2448	5322 122 31647	1NF10%X7R 63V
2454	5322 122 32654	22NF10%X7R 63V
2455	4822 124 41751	47UF 20% 50V
2456	4822 124 40433	47UF20% 25V
2457	5322 122 32654	22NF10%X7R 63V
2458	5322 122 32654	22NF10%X7R 63V
2459	5322 122 32654	22NF10%X7R 63V
2460	5322 122 32654	22NF10%X7R 63V
2461	5322 122 32654	22NF10%X7R 63V
2462	5322 122 31647	1NF10%X7R 63V
2463	5322 122 32531	100PF 5%NP0 50V
2464	5322 122 32531	100PF 5%NP0 50V
2465	5322 122 32531	100PF 5%NP0 50V
2466	5322 122 32531	100PF 5%NP0 50V
2467	5322 122 32531	100PF 5%NP0 50V
2468	5322 122 32531	100PF 5%NP0 50V
2469	5322 122 32531	100PF 5%NP0 50V
2470	5322 122 32531	100PF 5%NP0 50V
2471	5322 122 32531	100PF 5%NP0 50V
2472	5322 122 32531	100PF 5%NP0 50V
2473	5322 122 32531	100PF 5%NP0 50V
2474	5322 122 32531	100PF 5%NP0 50V
2475	5322 122 32531	100PF 5%NP0 50V
2476	5322 122 32531	100PF 5%NP0 50V
2477	5322 122 32531	100PF 5%NP0 50V
2478	5322 122 32531	100PF 5%NP0 50V
2485	5322 122 31647	1NF10%X7R 63V
2486	4822 122 33197	1NF 10% 50V

RESISTORS

3391	4822 051 10102	1K00 2% 0,25W
3392	4822 051 20223	22K00 5% 0,1W
3393	4822 051 20223	22K00 5% 0,1W
3394	4822 051 20223	22K00 5% 0,1W
3395	4822 051 20008	0R00 JUMP. (0805)
3400	4822 051 20479	47R00 5% 0,1W
3401	4822 050 21003	10K00 1% 0,6W
3402	4822 050 21003	10K00 1% 0,6W
3403	4822 117 11507	6K8 1% 0,1W
3404	4822 116 52219	330E 5% 0,5W
3405	4822 116 52257	22K 5% 0,5W
3406	4822 050 21003	10K00 1% 0,6W
3407	4822 050 21003	10K00 1% 0,6W
3408	4822 050 21003	10K00 1% 0,6W
3409	4822 051 10102	1K00 2% 0,25W
3410	4822 117 11449	2K2 1% 0,1W
3411	4822 117 13579	220K 1% 0.1W
3413	4822 050 11002	1K00 1% 0,4W
3414	4822 051 10102	1K00 2% 0,25W
3415	4822 051 20008	0R00 JUMP.
3416	4822 117 10833	10K 1% 0,1W
3417	4822 117 10833	10K 1% 0,1W
3418	4822 117 10833	10K 1% 0,1W
3419	4822 117 10833	10K 1% 0,1W
3420	4822 117 10833	10K 1% 0,1W
3421	4822 117 10833	10K 1% 0,1W
3422	4822 117 10833	10K 1% 0,1W
3424	4822 050 11002	1K00 1% 0,4W
3426	4822 050 11002	1K00 1% 0,4W
3427	4822 116 83868	150R 5% 0,5W
3428	4822 051 20273	27K00 5% 0,1W
3429	4822 051 20223	22K00 5% 0,1W
3430	4822 051 20223	22K00 5% 0,1W
3431	4822 117 10833	10K 1% 0,1W
3432 ▲	4822 052 10478	4R70 5% 0,33W
3433	4822 117 10833	10K 1% 0,1W
3434	4822 051 20223	22K00 5% 0,1W
3435	4822 116 52257	22K 5% 0,5W
3436	4822 116 52257	22K 5% 0,5W
3437	4822 117 10837	100K 1% 0.1W
3438	4822 117 13579	220K 1% 0.1W
3439	4822 117 10833	10K 1% 0,1W
3440	4822 051 20479	47R00 5% 0,1W
3441	4822 117 11149	82K 1% 0,1W
3442	4822 117 10837	100K 1% 0.1W
3443	4822 116 52219	330E 5% 0,5W
3444	4822 116 52219	330E 5% 0,5W
3445	4822 117 13577	330R 1% 1,25W
3446	4822 117 13577	330R 1% 1,25W
3447	4822 116 52219	330E 5% 0,5W
3448	4822 116 52219	330E 5% 0,5W
3449	4822 117 10837	100K 1% 0.1W
3451	4822 117 10833	10K 1% 0,1W
3452	4822 116 52219	330E 5% 0,5W
3453	4822 116 52219	330E 5% 0,5W
3455	4822 051 20223	22K00 5% 0,1W
3457	4822 116 52219	330E 5% 0,5W
3458	4822 117 13577	330R 1% 1,25W
3459	4822 117 10833	10K 1% 0,1W
3460	4822 117 10833	10K 1% 0,1W
3461	4822 117 10833	10K 1% 0,1W
3462	4822 117 10833	10K 1% 0,1W
3463	4822 117 10833	10K 1% 0,1W
3464	4822 117 10833	10K 1% 0,1W
3465	4822 117 11503	220R 1% 0.1W
3466	4822 117 11503	220R 1% 0.1W
3467	4822 117 11503	220R 1% 0.1W
3468	4822 117 11503	220R 1% 0.1W
3469	4822 117 11503	220R 1% 0.1W
3470	4822 117 11503	220R 1% 0.1W
3471	4822 051 10102	1K00 2% 0,25W
3472	4822 051 10102	1K00 2% 0,25W
3473	4822 051 20008	0R00 JUMP. (0805)
3474	4822 051 20008	0R00 JUMP. (0805)
3475	4822 117 10837	100K 1% 0.1W
3477	4822 117 12521	68R 1% 0,1W
3478	4822 117 10837	100K 1% 0.1W
3479	4822 051 10102	1K00 2% 0,25W
3480	4822 117 10837	100K 1% 0.1W
3481	4822 051 10102	1K00 2% 0,25W
3482	4822 117 10837	100K 1% 0.1W
3484	4822 051 10102	1K00 2% 0,25W
3485	4822 051 20008	0R00 JUMP. (0805)
3491	4822 117 10837	100K 1% 0.1W
3493	4822 051 20471	470R00 5% 0,1W
3494	4822 051 20471	470R00 5% 0,1W
3495	4822 051 20471	470R00 5% 0,1W
3496	4822 051 20471	470R00 5% 0,1W
3497	4822 051 20471	470R00 5% 0,1W
3498	4822 051 20471	470R00 5% 0,1W
3499	4822 051 20471	470R00 5% 0,1W
3500	4822 051 20471	470R00 5% 0,1W
3501	4822 051 20471	470R00 5% 0,1W
3502	4822 051 10102	1K00 2% 0,25W
3751	4822 051 20333	33K00 5% 0,1W
3752	4822 051 20333	33K00 5% 0,1W
3753	4822 051 20333	33K00 5% 0,1W
3754	4822 051 20333	33K00 5% 0,1W
3755	4822 051 20333	33K00 5% 0,1W
3756	4822 051 20333	33K00 5% 0,1W
3757	4822 051 20333	33K00 5% 0,1W
3758	4822 051 20333	33K00 5% 0,1W
3759	4822 051 20333	33K00 5% 0,1W
3760	4822 051 20333	33K00 5% 0,1W
3761	4822 051 20333	33K00 5% 0,1W
3762	4822 051 20333	33K00 5% 0,1W
3763	4822 051 20333	33K00 5% 0,1W
3764	4822 051 20333	33K00 5% 0,1W
3765	4822 051 20333	33K00 5% 0,1W
3766	4822 051 20333	33K00 5% 0,1W
3767	4822 051 20333	33K00 5% 0,1W
3768	4822 051 20333	33K00 5% 0,1W
3769	4822 051 20333	33K00 5% 0,1W
3770	4822 051 20333	33K00 5% 0,1W
3771	4822 051 20333	33K00 5% 0,1W
3772	4822 051 20333	33K00 5% 0,1W
3773	4822 051 20333	33K00 5% 0,1W
3774	4822 051 20333	33K00 5% 0,1W
3775	4822 051 20333	33K00 5% 0,1W
3776	4822 051 20333	33K00 5% 0,1W
3777	4822 051 20333	33K00 5% 0,1W
3778	4822 051 20333	33K00 5% 0,1W
3779	4822 051 20333	33K00 5% 0,1W
3780	4822 051 20333	33K00 5% 0,1W
3781	4822 051 20333	33K00 5% 0,1W
3785	4822 051 10102	1K00 2% 0,25W
3786	4822 051 10102	1K00 2% 0,25W
4401	4822 051 20008	0R00 JUMP. (0805)
4402	4822 051 20008	0R00 JUMP. (0805)
4403	4822 051 20008	0R00 JUMP. (0805)
4404	4822 051 20008	0R00 JUMP. (0805)
4406	4822 051 20008	0R00 JUMP. (0805)
4407	4822 051 20008	0R00 JUMP. (0805)
4408	4822 051 20008	0R00 JUMP. (0805)
4410	4822 051 20008	0R00 JUMP. (0805)
4411	4822 051 20008	0R00 JUMP. (0805)
4413	4822 051 20008	0R00 JUMP. (0805)
4416	4822 051 20008	0R00 JUMP. (0805)
4417	4822 051 20008	0R00 JUMP. (0805)
4418	4822 051 20008	0R00 JUMP. (0805)
4420	4822 051 20008	0R00 JUMP. (0805)
4421	4822 051 20008	0R00 JUMP. (0805)
4422	4822 051 20008	0R00 JUMP. (0805)
4423	4822 051 20008	0R00 JUMP. (0805)
4424	4822 051 20008	0R00 JUMP. (0805)
4425	4822 051 20008	0R00 JUMP. (0805)
4426	4822 051 20008	0R00 JUMP. (0805)
4450	4822 051 20008	0R00 JUMP. (0805)

COILS & FILTERS

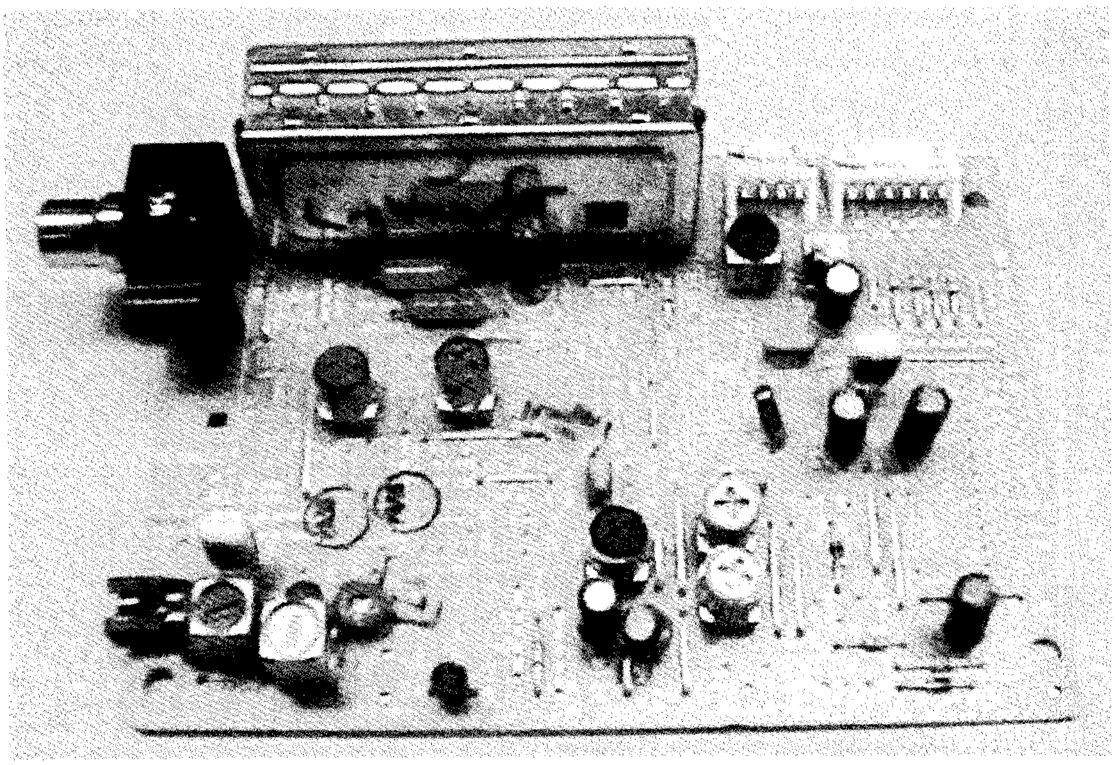
5400	4822 157 11477	LAL02TB2R2J
5401	4822 157 11477	LAL02TB2R2J
5402	4822 157 11477	LAL02TB2R2J
5403	4822 157 11477	LAL02TB2R2J

DIODES

6400	9322 100 14682	LTL1214A
6401	4822 130 82978	LTL-16KPE-P
6402	4822 130 30621	1N4148
6403	4822 130 30621	1N4148
6404	4822 130 30621	1N4148
6405	4822 130 30621	1N4148
6406	4822 130 30621	1N4148
6407	4822 130 82978	LTL-16KPE-P
6408	4822 130 82978	LTL-16KPE-P
6409	4822 130 82978	LTL-16KPE-P
6410	4822 130 82978	LTL-16KPE-P
6412	4822 130 82978	LTL-16KPE-P
6413	4822 130 82978	LTL-16KPE-P
6414	4822 130 30621	1N4148
6415	4822 130 82978	LTL-16KPE-P
6416	4822 130 82978	LTL-16KPE-P
6417	4822 130 82978	LTL-16KPE-P
6418	4822 130 82978	LTL-16KPE-P
6419	4822 130 30621	1N4148
6420	4822 130 30621	1N4148
6421	4822 130 82978	LTL-16KPE-P

TRANSISTORS & ICs

7402	4822 130 11607	PDTA144ET
7403	4822 130 10165	GP1U28XP
7404	4822 209 31981	SAA6579T
7405	4822 209 17445	M24C08-MN6
7406	4822 130 60511	BC847B
7407	4822 130 60511	BC847B
7408	4822 130 60511	BC847B
7409	4822 130 60511	BC847B
7411	5322 209 11306	HEF4094BT
7412	5322 209 11306	HEF4094BT
7413	2722 171 07168	16-MT-65GK
7415	3103 308 84190	TMP87CS71F/FR975.1
7416	4822 130 60511	BC847B
7417	4822 130 60511	BC847B
7418	4822 130 60511	BC847B

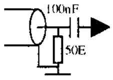


TUNER 95 BOARD

TABLE OF CONTENTS

Adjustment table 7A-2
Blockdiagram 7A-3
Component layout 7A-4
Circuit diagram 7A-5
Partslist 7A-6

TUNER 95 bis Adjustment Table (FM, MW, LW with Frame antenna)

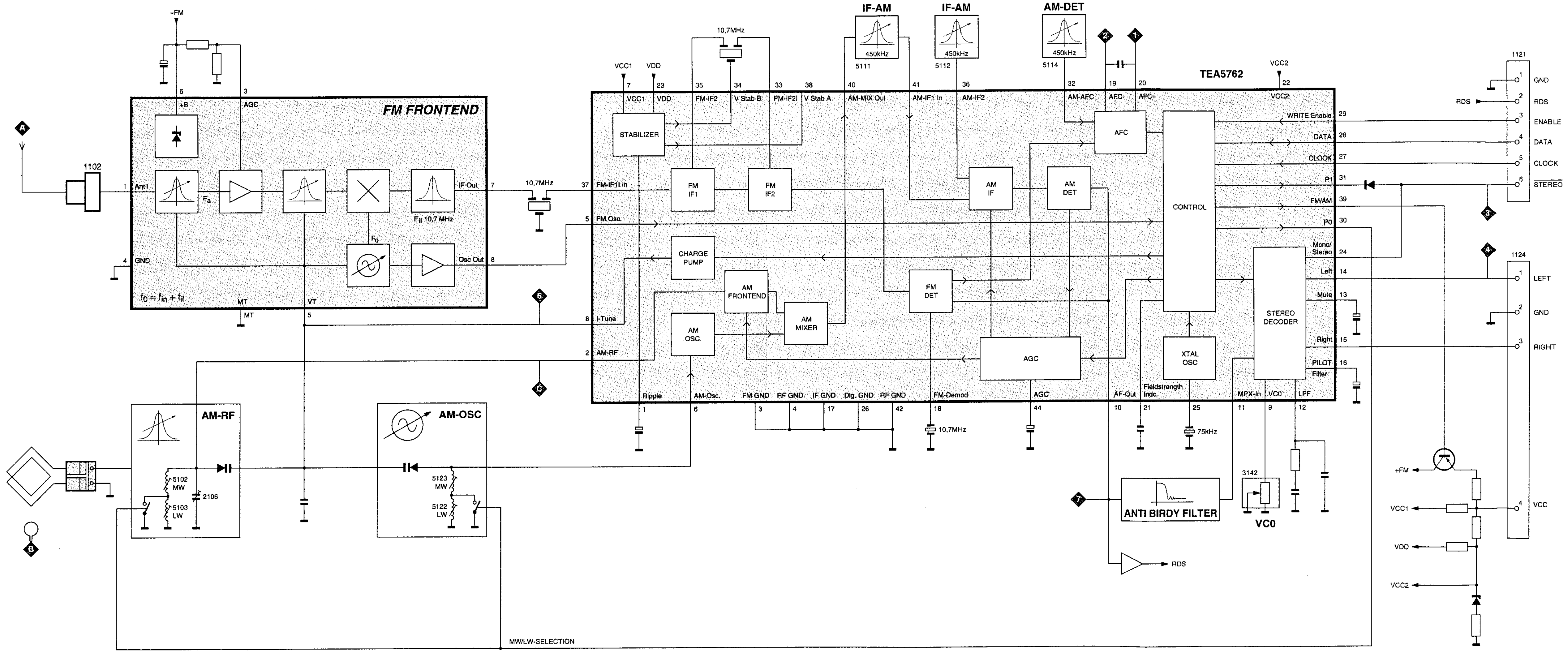
Waverange	**Input frequency**	**Input**	**Set tuned to**	**Adjust**	**Output**	**Scope / Voltmeter**
VARICAP ALIGNMENT						
FM (50)			108 MHz	check	6	7 ... 9V
87.5 - 108 MHz			87.5 MHz	check		1.3 ... 2V
MW (9)			1602 kHz	5123		8.3V ± 0.2V
531 - 1602 kHz			531 kHz	check		1V ± 0.4V
LW (3)			279 kHz	5122		8.3V ± 0.2V
153 - 279 kHz			153 kHz	check		1V ± 0.4V
FM – DETECTION						
FM	98 Mhz 1mV continuous wave *short pin 21 (IC7101) to ground*	A	98 MHz	5107	1 2	0mV ± 3mV
FM – VCO						
FM	98 Mhz 1 mV continuous wave	A	98 MHz	3142	3	152kHz ± 1 kHz
DISTORTION						
FM	98 Mhz 1 mV 90 % L + 9 % pilot mod = 1kHz	A	98MHz	mixcoil inside Tuner 1110	4	Distortion minimum
AM – IF						
MW	450kHz Δf = 10kHz Low as possible Swept signal	 C	MW	5111	7	symmetrical and max. height ↕
				5112		
	450kHz continuous wave			5114	1 2	0mV ± 2mV
AM - RF						
MW	558kHz Mod = 1kHz 30 % AM 1494 kHz	B	558kHz	5102	7	MAX ↕
			1494kHz	2106		
LW	198kHz mod = 1kHz 30 % AM	*	198kHz	5103		MAX

adjtable for 3104 217 04121/04341

* Signal send via a frame antenna
(..) = tuning grid in kHz

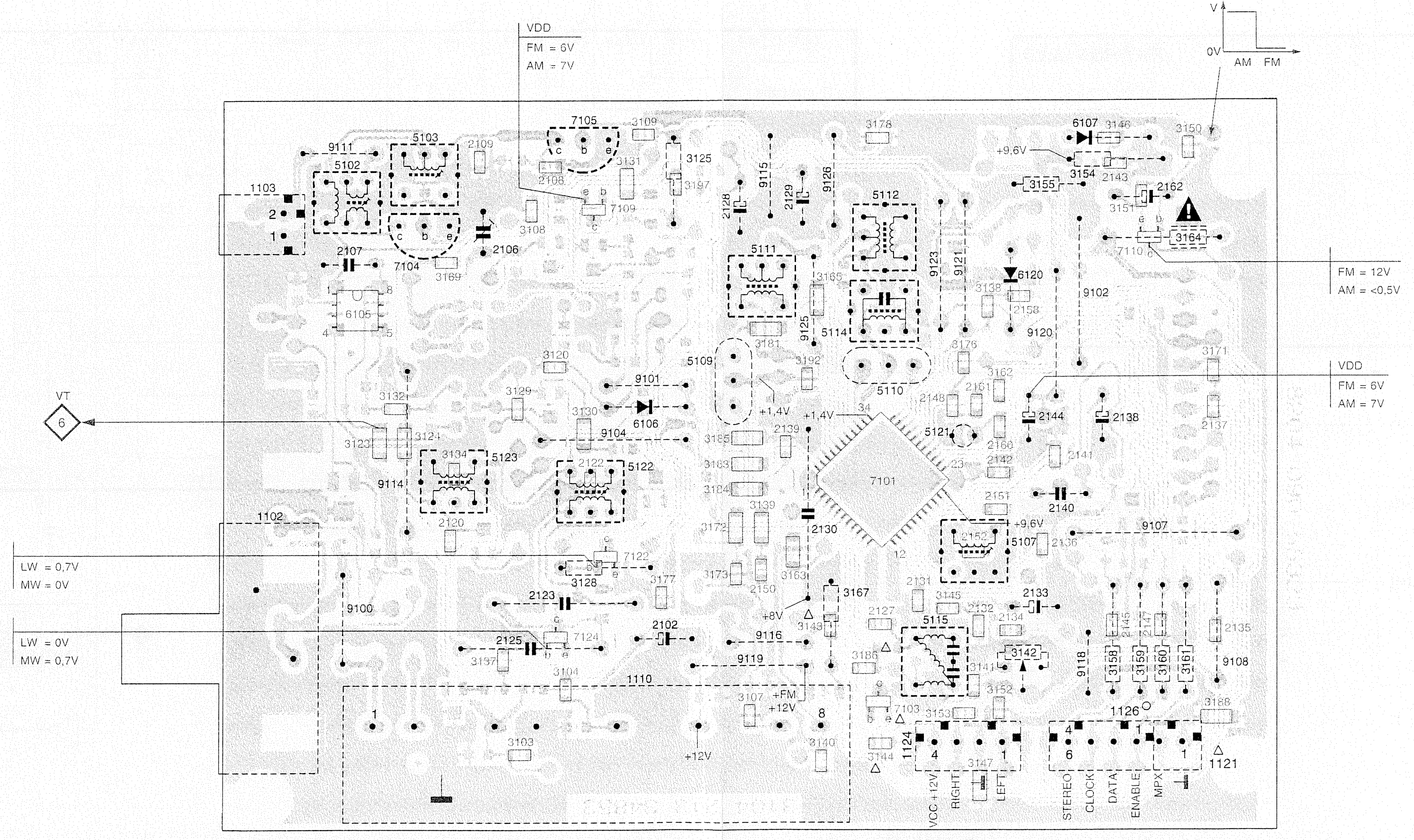
↕ repeat

BLOCKDIAGRAM

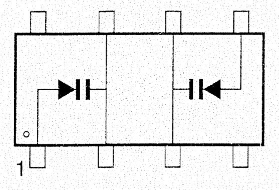

+FM
FM FRONTEND
+B
AGC
Ant1
1102
GND
Fa
F0
Fif 10,7 MHz
IF Out
Osc Out
f0 = fin + fif
MT
VT
10,7MHz
TEA5762
VCC1
VDD
VCC2
FM-IF2
V Stab B
FM-IF2I
V Stab A
AM-MIX Out
AM-IF1 In
AM-IF2
AM-AFC
AFC-
AFC+
IF-AM
IF-AM
AM-DET
450kHz
5111
5112
5114
STABILIZER
FM IF1
FM IF2
AM IF
AM DET
AFC
CONTROL
CHARGE PUMP
AM FRONTEND
AM MIXER
FM DET
AM OSC.
AGC
XTAL OSC
STEREO DECODER
FM-IF1 In
FM Osc.
I-Tune
AM-RF
Ripple
AM-Osc.
FM GND
RF GND
IF GND
Dig. GND
RF GND
FM-Demod
AGC
AF-Out
Fieldstrength Indc.
MPX-In
VC0
LPF
WRITE Enable
DATA
CLOCK
P1
FM/AM
P0
Mono/ Stereo
Left
Mute
Right
PILOT Filter
75kHz
10,7MHz
3142
VC0
ANTI BIRDY FILTER
RDS
AM-RF
5102 MW
5103 LW
2106
AM-OSC
5123 MW
5122 LW
MW/LW-SELECTION
1121
GND
RDS
ENABLE
DATA
CLOCK
STEREO
1124
LEFT
GND
RIGHT
VCC
+FM
VCC1
VDD
VCC2
A
B
C
1
2
3
4
6
7

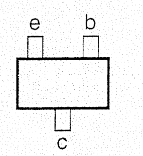
1102	F4	2107	C4	2128	C7	2136	G10	2144	E10	2160	E9	3120	D6	3132	E5	3143	G8	3153	G9	3163	F8	3176	D9	3188	G11	5111	C8	6106	E7	7110	D11	9108	G11	9121	D9
1103	C4	2108	C6	2129	C8	2137	E11	2145	G11	2161	E9	3123	E4	3134	E5	3144	H9	3154	C10	3164	C11	3177	F7	3192	D8	5112	C9	6107	B10	7122	F7	9111	C4	9123	D9
1110	G7	2109	C5	2130	F8	2138	E10	2147	G11	2162	C11	3124	E5	3137	G5	3145	F9	3155	C10	3165	D8	3178	B8	3197	C7	5114	D8	6120	D10	7124	G6	9114	E5	9125	D8
1121	H11	2120	F5	2131	F9	2139	E8	2148	E9	3103	H6	3125	C7	3138	D9	3146	B10	3158	G11	3167	F8	3181	D8	5102	C4	5115	G9	7101	E9	9100	F4	9115	C8	9126	C8
1124	H9	2122	E6	2132	F9	2140	F10	2150	F8	3104	G6	3128	F6	3139	F8	3147	H9	3159	G11	3169	D5	3183	E7	5103	C5	5121	E9	7103	G9	9101	E7	9116	G8		
1126	G10	2123	F6	2133	F10	2141	E10	2151	F9	3107	G7	3129	E6	3140	H8	3150	C11	3160	G11	3171	D11	3184	E7	5107	F10	5122	E7	7104	D5	9102	D10	9118	G10		
2102	G7	2125	G6	2134	G10	2142	E9	2152	F9	3108	C6	3130	E6	3141	G9	3151	C10	3161	G11	3172	F7	3185	E7	5109	D7	5123	E5	7105	B6	9104	E6	9119	G7		
2106	C5	2127	F9	2135	G11	2143	C10	2158	D10	3109	B7	3131	C6	3142	G10	3152	G9	3162	D9	3173	F7	3186	G8	5110	E9	6105	D4	7109	C6	9107	F11	9120	D10		

TUNER 95 bis Combi: Copper side view


VDD
FM = 6V
AM = 7V
V
0V
AM FM
FM = 12V
AM = <0,5V
VDD
FM = 6V
AM = 7V
VT
6
LW = 0,7V
MW = 0V
LW = 0V
MW = 0,7V
7101
1103
1102
1110
1124
1126
1121
+9,6V
+1,4V
+8V
+12V
+FM
VCC +12V
RIGHT
LEFT
STEREO
CLOCK
DATA
ENABLE
MPX

IC 6105





△ only in RDS version (04121)

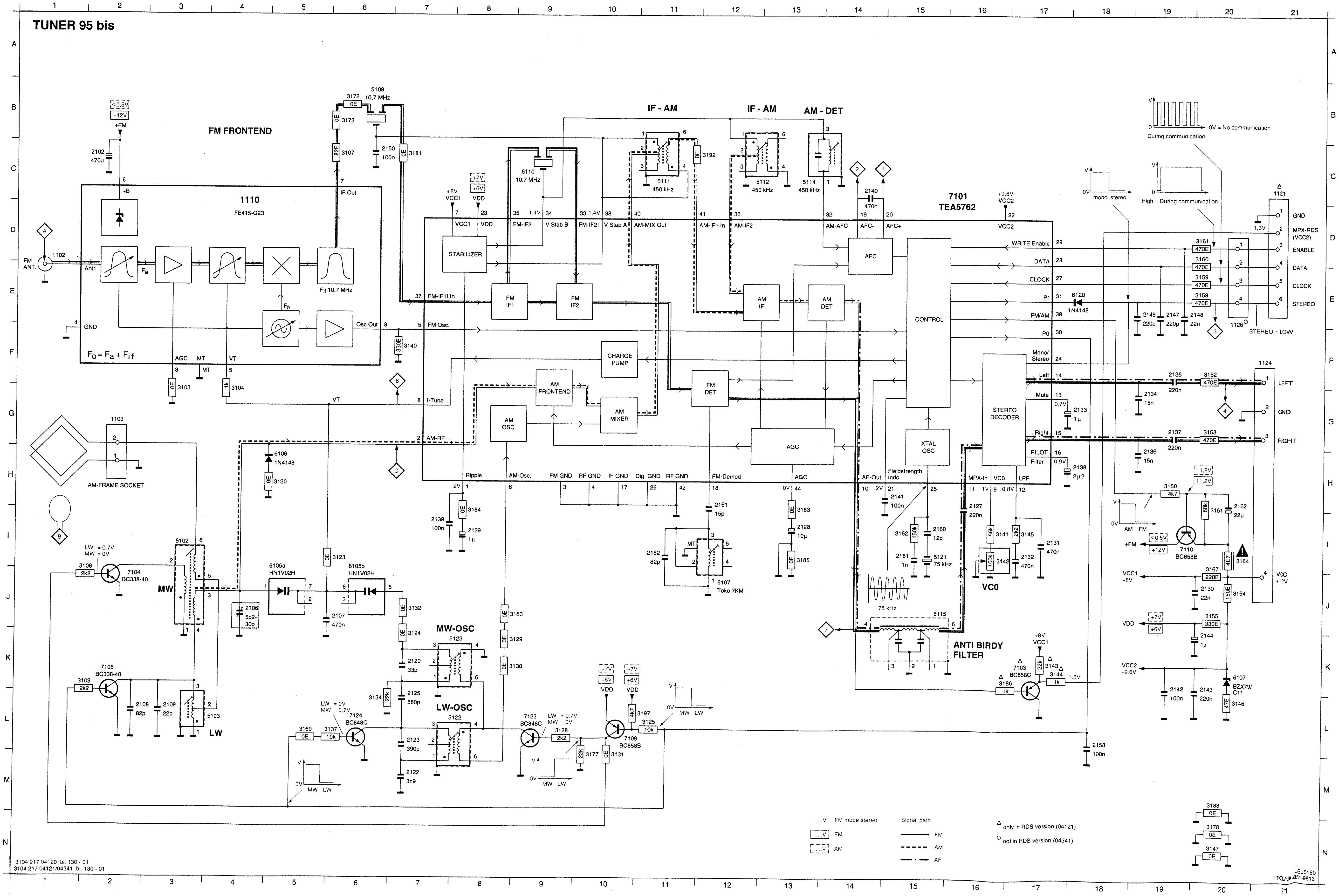
○ not in RDS version (04341)

1102	D1	1124	F21	2107	J6	2122	M7	2128	I13	2132	I17	2136	H19	2140	C14	2144	K20	2150	C6
1103	G2	1126	E20	2108	L2	2123	L7	2129	I8	2133	G18	2137	G19	2141	H15	2145	E19	2151	H12
1110	D4	2102	C2	2109	L3	2125	L7	2130	J20	2134	G19	2138	H18	2142	K19	2147	E19	2152	I11
1121	C21	2106	J4	2120	K7	2127	H16	2131	I17	2135	F19	2139	I7	2143	K20	2148	E19	2158	L18

2160	I15	3104	G4	3120	H5	3128	L9	3132	J7	3141	I16	3145	I17	3151	I20	3155	J20	3161	D19
2161	I15	3107	C6	3123	I6	3129	K8	3134	L6	3142	I16	3146	L20	3152	F20	3158	E19	3162	I15
2162	H20	3108	J1	3124	K7	3130	K8	3137	L5	3143	K17	3147	N20	3153	G20	3159	E19	3163	J8
3103	G3	3109	K1	3125	L11	3131	M10	3140	F7	3144	K17	3150	H19	3154	J20	3160	D19	3164	I20

3167	I20	3177	M10	3184	I8	3192	C12	5107	J12	5112	C12	5122	L7	6106	H5	7103	K17	7110	I19
3169	L5	3178	N20	3185	I13	3197	L11	5109	B6	5114	C13	5123	K7	6107	K20	7104	J2	7122	L9
3172	B6	3181	C7	3186	K16	5102	I3	5110	C9	5115	J15	6105a	I5	6120	E17	7105	K2	7124	L6
3173	B6	3183	I13	3188	M20	5103	L4	5111	C11	5121	I15	6105b	I6	7101	C15	7109	L10		

TUNER 95 bis


FM FRONTEND
1110
FE415-G23
+B
IF Out
FM ANT.
1102
Ant1
Fa
Fif 10,7 MHz
Fo
Osc Out
GND
Fo = Fa + Fif
AGC
MT
VT
+FM
<0.5V
+12V
2102 470u
3172 0E
5109 10,7 MHz
3173
3107 82E
2150 100n
3181
5110 10,7 MHz
3140 330E
3103 0E
3104 1k
IF - AM
IF - AM
AM - DET
5111 450 kHz
5112 450 kHz
5114 450 kHz
3192
2140 470n
7101
TEA5762
+9.6V VCC2
+8V VCC1
+7V +6V VDD
VCC1
VDD
FM-IF2
V Stab B
FM-IF2I
V Stab A
AM-MIX Out
AM-IF1 In
AM-IF2
AM-AFC
AFC-
AFC+
VCC2
STABILIZER
FM IF1
FM IF2
FM-IF1 In
FM Osc.
I-Tune
AM-RF
CHARGE PUMP
AM FRONTEND
AM MIXER
AM OSC.
AM IF
AM DET
FM DET
AFC
AGC
CONTROL
XTAL OSC
STEREO DECODER
WRITE Enable
DATA
CLOCK
P1
FM/AM
P0
Mono/ Stereo
Left
Mute
Right
PILOT Filter
Ripple
AM-Osc.
FM GND
RF GND
IF GND
Dig. GND
RF GND
FM-Demod
AGC
AF-Out
Fieldstrength Indc.
MPX-In
VCO
LPF
6120 1N4148
2145 220p
2147 220p
2148 22n
3161 470E
3160 470E
3159 470E
3158 470E
1126
STEREO = LOW
1121
GND
MPX-RDS (VCC2)
ENABLE
DATA
CLOCK
STEREO
1,3V
0V = No communication
During communication
mono stereo
High = During communication
1124
LEFT
GND
RIGHT
VCC +12V
2135 220n
3152 470E
2134 15n
2133 1µ
2137 220n
3153 470E
2136 15n
2138 2µ2
0,7V
0,9V
11,8V
11,2V
3150 4k7
3151 68k
2162 22µ
7110 BC858B
AM FM
+FM
<0.5V
+12V
3164 4E7
VCC1 +8V
3167 220E
2130 22n
3154 150E
VDD
+7V +6V
3155 330E
2144 1µ
VCC2 +9,6V
6107 BZX79/ C11
2142 100n
2143 220n
3146 47E
2158 100n
1103
AM-FRAME SOCKET
6106 1N4148
3120 0E
2139 100n
3184 0E
2129 1µ
2151 15p
2152 82p
MT
5107 Toko 7KM
3183 0E
2128 10µ
3185 0E
2141 100n
2127 220n
3162 150k
2160 12p
2161 1n
5121 75 kHz
3141 56k
3145 2k2
3142 100k
2132 470n
2131 470n
VCO
75 kHz
5115
ANTI BIRDY FILTER
+8V VCC1
7103 BC858C
3143
3144 1k
1.3V
3186 1k
LW = 0,7V MW = 0V
3108 2k2
7104 BC338-40
MW
5102
2106 5p2- 30p
6105a HN1V02H
6105b HN1V02H
3123 0E
2107 470n
3132 0E
3124 0E
3163 0E
3129 0E
3130 0E
MW-OSC
5123
2120 33p
2125 560p
3134 22k
LW-OSC
5122
2123 390p
2122 3n9
7105 BC338-40
3109 2k2
2108 82p
2109 22p
5103
LW
LW = 0V MW = 0,7V
7124 BC848C
3169 0E
3137 10k
7122 BC848C
LW = 0,7V MW = 0V
3128 2k2
3177 22k
3131 0E
+7V +6V VDD
+7V +6V VDD
3197 4k7
3125 10k
7109 BC858B
MW LW
...V FM mode stereo
.....V FM
V AM
Signal path
FM
AM
AF
Δ only in RDS version (04121)
○ not in RDS version (04341)
3188 0E
3178 0E
3147 0E
LEU0150
ITC/9 851-9813

3104 217 04120 bl. 130 - 01
3104 217 04121/04341 bl. 130 - 01

ELECTRICAL PARTSLIST - TUNER 95 BOARD

MISCELLANEOUS

1102	4822 267 10283	YKD31-0432
1103	4822 265 31184	S2B-XH-A-BK
1110	4822 210 10739	FE415-G23

CAPACITORS

2102	4822 124 80791	470UF20%16V
2106	4822 125 60102	5P2-30P N750100V
2107	4822 121 51252	470NF 5%63V
2108	4822 126 13695	82PF 1% NP063V
2109	5322 122 32658	22PF 5% 50V
2120	5322 122 32659	33PF5%50V
2122	5322 126 10465	3,9NF 10% X7R 50V 08
2123	4822 121 10766	390PF 1% 630V KP464
2125	4822 121 10578	560P1%630V
2127	4822 122 32927	220NF +80-20%Y5V 50V
2128	4822 124 41579	10UF 20% 50V
2129	4822 124 40242	1UF20%63V
2130	4822 126 11585	22NF+80-20% Y5V 25V
2131	4822 122 33325	470NF 16V
2132	4822 122 33325	470NF 16V
2133	4822 124 40242	1UF20%63V
2134	4822 126 13188	15NF 5% X7R63V
2135	4822 122 32927	220NF +80-20%Y5V 50V
2136	4822 126 13188	15NF 5% X7R63V
2137	4822 122 32927	220NF +80-20%Y5V 50V
2138	4822 124 41576	2,2UF 20% 50V
2139	4822 126 10002	100NF20%Y5V 25V
2140	4822 121 51252	470NF 5%63V
2141	4822 122 31947	100NF20%Y5V 63V
2142	4822 122 31947	100NF20%Y5V 63V
2143	4822 122 32927	220NF +80-20%Y5V 50V
2144	4822 124 40242	1UF20%63V
2145	4822 122 33575	220PF5%NPO50V
2147	4822 122 33575	220PF5%NPO50V
2148	4822 122 33809	22NF20%Y5V 50V
2150	4822 122 31947	100NF20%Y5V 63V
2151	4822 126 14236	50V 15P 5%
2152	4822 126 13695	82PF 1% NP063V
2158	4822 122 31947	100NF20%Y5V 63V
2160	4822 122 32139	12PF 2%NP0 63V
2161	5322 122 34123	1NF10%X7R 50V
2162	4822 124 81151	22UF 50V

RESISTORS

3103	4822 051 20008	0R00 JUMP. (0805)
3104	4822 051 10102	1K002% 0,25W
3107	4822 051 20829	82R005%0,1W
3108	4822 117 11449	2K2 1%0,1W
3109	4822 117 11449	2K2 1%0,1W
3110	4822 051 20008	0R00 JUMP. (0805)
3111	4822 051 20008	0R00 JUMP. (0805)
3120	4822 051 20008	0R00 JUMP. (0805)
3123	4822 051 10008	0R005% 0,25W
3124	4822 051 10008	0R005% 0,25W
3125	4822 116 83864	10K5%0,5W
3128	4822 116 52256	2K2 5%0,5W
3129	4822 051 20008	0R00 JUMP. (0805)
3130	4822 051 10008	0R005% 0,25W
3131	4822 051 10008	0R005% 0,25W
3132	4822 051 20008	0R00 JUMP. (0805)
3134	4822 051 20223	22K005%0,1W
3135	4822 051 20008	0R00 JUMP. (0805)
3137	4822 117 10833	10K1%0,1W
3138	4822 051 20008	0R00 JUMP. (0805)
3139	4822 051 10008	0R005% 0,25W
3140	4822 051 20331	330R005%0,1W
3141	4822 117 11148	56K1%0,1W
3142	4822 100 11163	100K30%LIN0,1W
3143	4822 051 20223	22K005%0,1W
3144	4822 051 10102	1K002% 0,25W
3145	4822 117 11449	2K2 1%0,1W
3146	4822 051 20479	47R005%0,1W
3147	4822 051 10008	0R005% 0,25W
3150	4822 051 20472	4K705%0,1W
3151	4822 051 20683	68K005%0,1W
3152	4822 051 20471	470R005%0,1W
3153	4822 051 20471	470R005%0,1W
3154	4822 116 83868	150R5%0,5W
3155	4822 116 52219	330E5%0,5W
3158	4822 116 83883	470R5%0,5W
3159	4822 116 83883	470R5%0,5W
3160	4822 116 83883	470R5%0,5W
3161	4822 116 83883	470R5%0,5W
3162	4822 051 20224	220K005%0,1W
3163	4822 051 10008	0R005% 0,25W
3164	4822 052 10478	4R705% 0,33W
3165	4822 051 10008	0R005% 0,25W
3167	4822 116 83872	220R5%0,5W
3169	4822 051 20008	0R00 JUMP. (0805)
3171	4822 051 20008	0R00 JUMP. (0805)
3172	4822 051 10008	0R005% 0,25W
3173	4822 051 20008	0R00 JUMP. (0805)
3176	4822 051 20008	0R00 JUMP. (0805)
3177	4822 051 20223	22K005%0,1W

ELECTRICAL PARTSLIST - TUNER 95 BOARD

RESISTORS

3178	4822 051 10008	0R005% 0,25W
3181	4822 051 10008	0R005% 0,25W
3183	4822 051 10008	0R005% 0,25W
3184	4822 051 10008	0R005% 0,25W
3185	4822 051 10008	0R005% 0,25W
3186	4822 051 10102	1K002% 0,25W
3188	4822 051 10008	0R005% 0,25W
3192	4822 051 20008	0R00 JUMP. (0805)
3197	4822 051 20472	4K705%0,1W

COILS & FILTERS

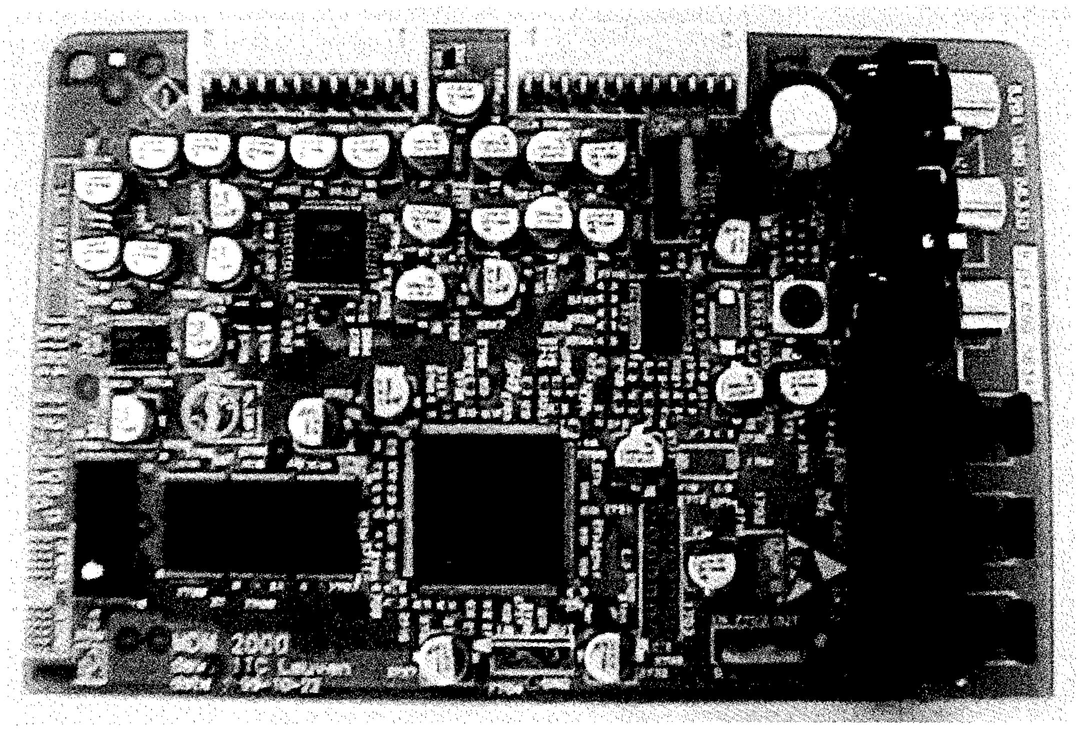
5102	4822 157 71634	MW AERIAL
5103	4822 157 71635	LW AERIAL
5107	4822 157 11443	2U4 10M7
5109	4822 157 71639	SFE10,7MJA10H-A-TF21
5110	4822 242 70665	SFE10,7MS3-A
5111	4822 158 60511	AM-1F
5112	4822 157 70302	F7MCS-12216N
5114	4822 157 70302	F7MCS-12216N
5115	4822 157 71636	BIRDIE COIL
5121	4822 242 10261	T6252F00 (75KHZ)
5122	4822 157 60517	110,00 UH8%
5123	4822 157 60517	110,00 UH8%

DIODES

6105	4822 130 83075	HN1V02H-B
6106	4822 130 30621	1N4148
6107	4822 130 34488	BZX79-B11
6120	4822 130 30621	1N4148

TRANSISTORS & INTERGRATED CIRCUITS

7101	4822 209 90315	TEA5762H/V1
7103	4822 130 42513	BC858C
7104	5322 130 44779	BC338-40
7105	5322 130 44779	BC338-40
7109	5322 130 41983	BC858B
7110	5322 130 41983	BC858B
7122	5322 130 42136	BC848C
7124	5322 130 42136	BC848C

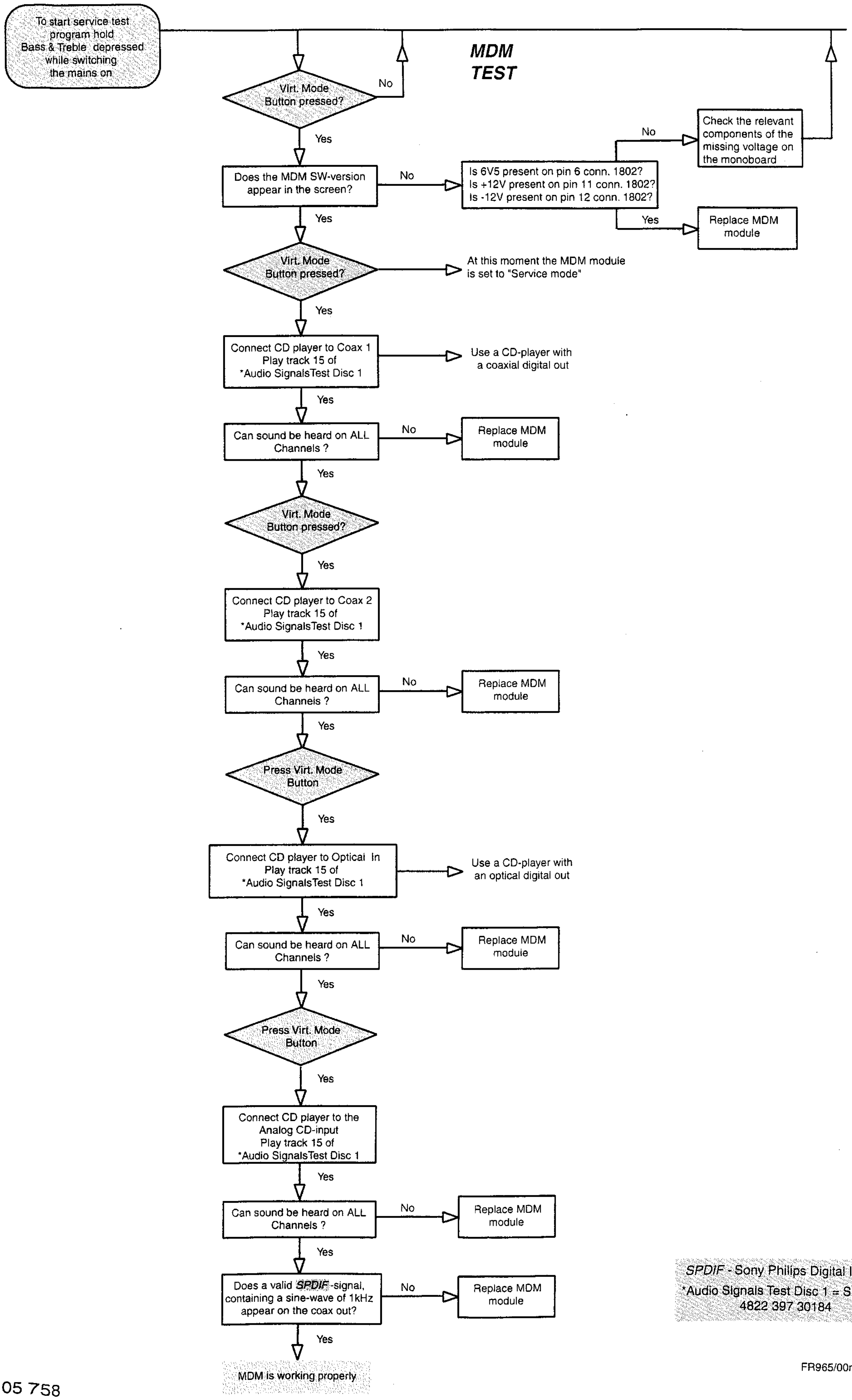


MULTI-CHANNEL DECODING MODULE

TABLE OF CONTENTS

Troubleshooting 8-2
Block-diagram 8-3
Partslist 8-4

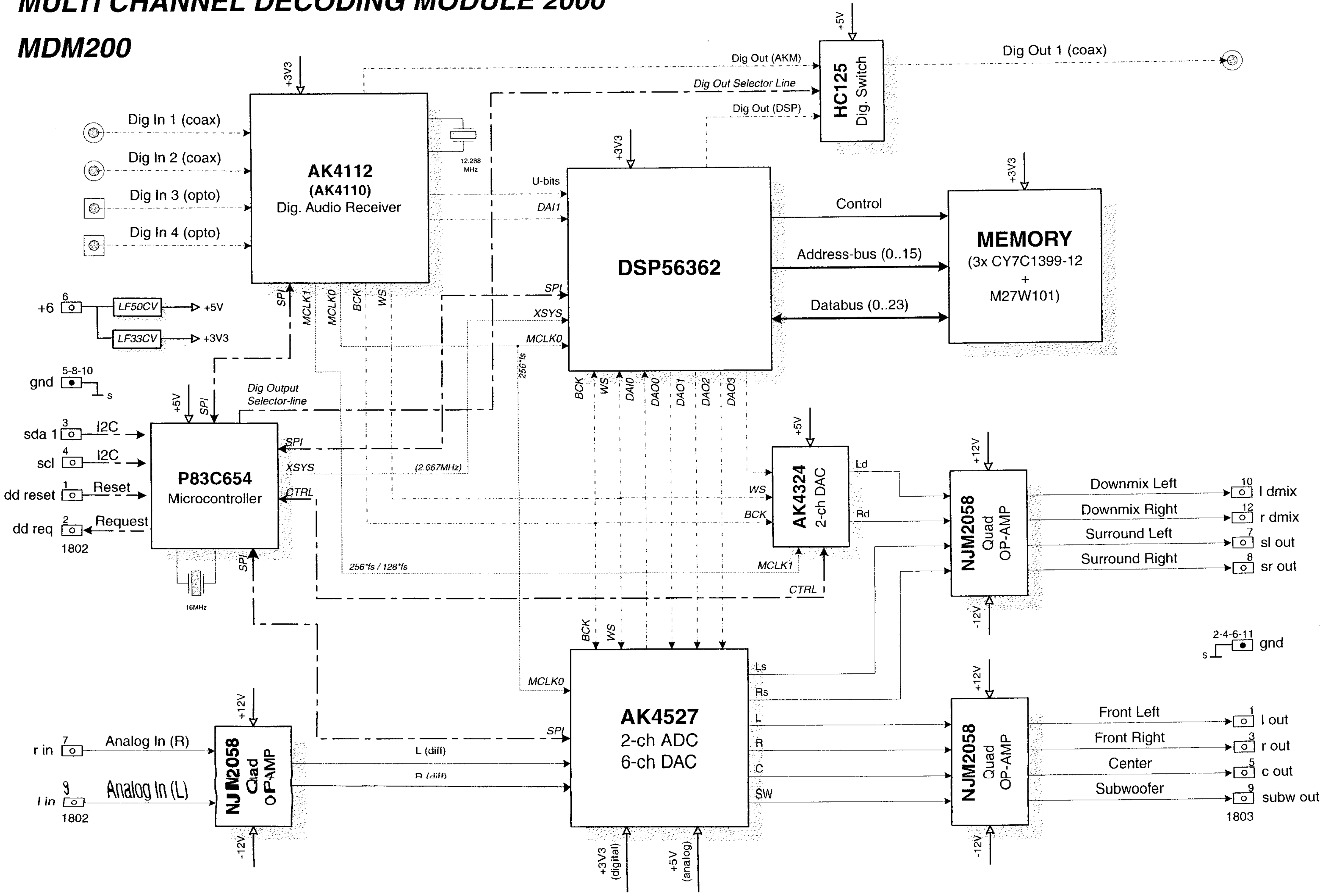
MULTI-CHANNEL DECODING MODULE - Troubleshooting


To start service test program hold Bass & Treble depressed while switching the mains on
MDM TEST
Virt. Mode Button pressed?
No
Yes
Does the MDM SW-version appear in the screen?
No
Is 6V5 present on pin 6 conn. 1802?
Is +12V present on pin 11 conn. 1802?
Is -12V present on pin 12 conn. 1802?
No
Check the relevant components of the missing voltage on the monoboard
Yes
Replace MDM module
Yes
Virt. Mode Button pressed?
At this moment the MDM module is set to "Service mode"
Yes
Connect CD player to Coax 1 Play track 15 of *Audio SignalsTest Disc 1
Use a CD-player with a coaxial digital out
Yes
Can sound be heard on ALL Channels ?
No
Replace MDM module
Yes
Virt. Mode Button pressed?
Yes
Connect CD player to Coax 2 Play track 15 of *Audio SignalsTest Disc 1
Yes
Can sound be heard on ALL Channels ?
No
Replace MDM module
Yes
Press Virt. Mode Button
Yes
Connect CD player to Optical In Play track 15 of *Audio SignalsTest Disc 1
Use a CD-player with an optical digital out
Yes
Can sound be heard on ALL Channels ?
No
Replace MDM module
Yes
Press Virt. Mode Button
Yes
Connect CD player to the Analog CD-input Play track 15 of *Audio SignalsTest Disc 1
Yes
Can sound be heard on ALL Channels ?
No
Replace MDM module
Yes
Does a valid SPDIF-signal, containing a sine-wave of 1kHz appear on the coax out?
No
Replace MDM module
Yes
MDM is working properly

SPDIF - Sony Philips Digital Inter Face
*Audio Signals Test Disc 1 = SBC42
4822 397 30184

MULTI CHANNEL DECODING MODULE 2000

MDM200

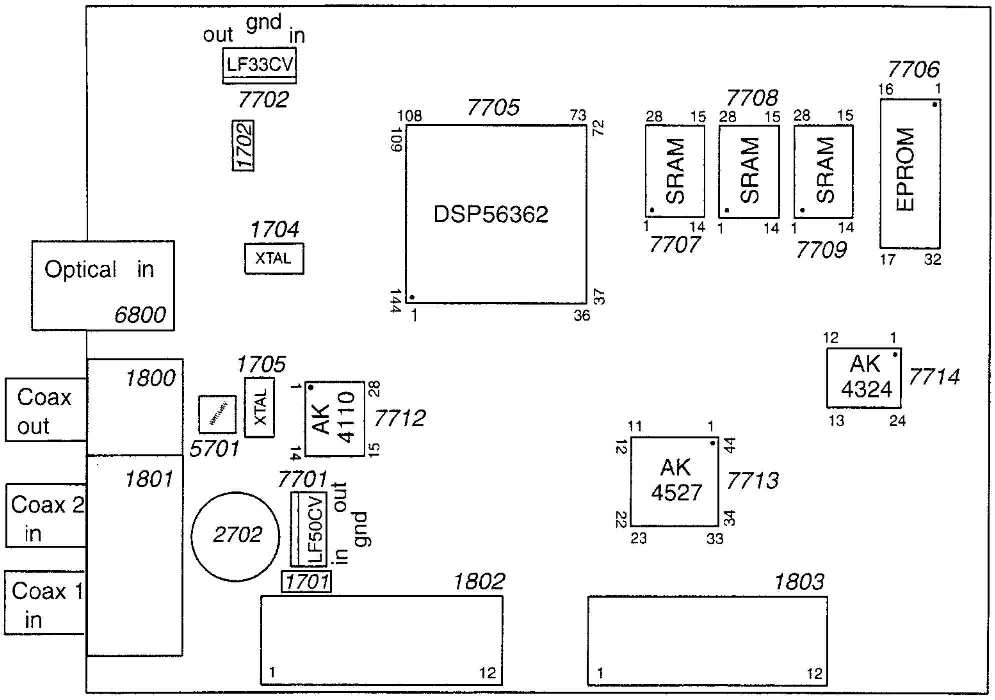

+5V
HC125
Dig. Switch
Dig Out (AKM)
Dig Out Selector Line
Dig Out (DSP)
Dig Out 1 (coax)
+3V3
AK4112
(AK4110)
Dig. Audio Receiver
12.288 MHz
Dig In 1 (coax)
Dig In 2 (coax)
Dig In 3 (opto)
Dig In 4 (opto)
SPI
MCLK1
MCLK0
BCK
WS
+3V3
DSP56362
U-bits
DAI1
SPI
XSYS
MCLK0
256*fs
BCK
WS
DAI0
DAO0
DAO1
DAO2
DAO3
Control
Address-bus (0..15)
Databus (0..23)
+3V3
MEMORY
(3x CY7C1399-12
+
M27W101)
+6
6
LF50CV
+5V
LF33CV
+3V3
gnd
5-8-10
s
+5V
SPI
Dig Output
Selector-line
P83C654
Microcontroller
SPI
XSYS
(2.667MHz)
CTRL
sda 1
3
I2C
scl
4
I2C
dd reset
1
Reset
dd req
2
Request
1802
16MHz
SPI
256*fs / 128*fs
+5V
AK4324
2-ch DAC
Ld
Rd
WS
BCK
MCLK1
CTRL
+12V
NJM2058
Quad
OP-AMP
-12V
Downmix Left
10
l dmix
Downmix Right
12
r dmix
Surround Left
7
sl out
Surround Right
8
sr out
2-4-6-11
gnd
s
BCK
WS
MCLK0
SPI
AK4527
2-ch ADC
6-ch DAC
Ls
Rs
L
R
C
SW
+3V3
(digital)
+5V
(analog)
+12V
NJM2058
Quad
OP-AMP
-12V
Front Left
1
l out
Front Right
3
r out
Center
5
c out
Subwoofer
9
subw out
1803
+12V
NJM2058
Quad
OP-AMP
-12V
r in
7
Analog In (R)
l in
9
Analog In (L)
1802
L (diff)
R (diff)

ELECTRICAL PARTSLIST - MDM MODULE

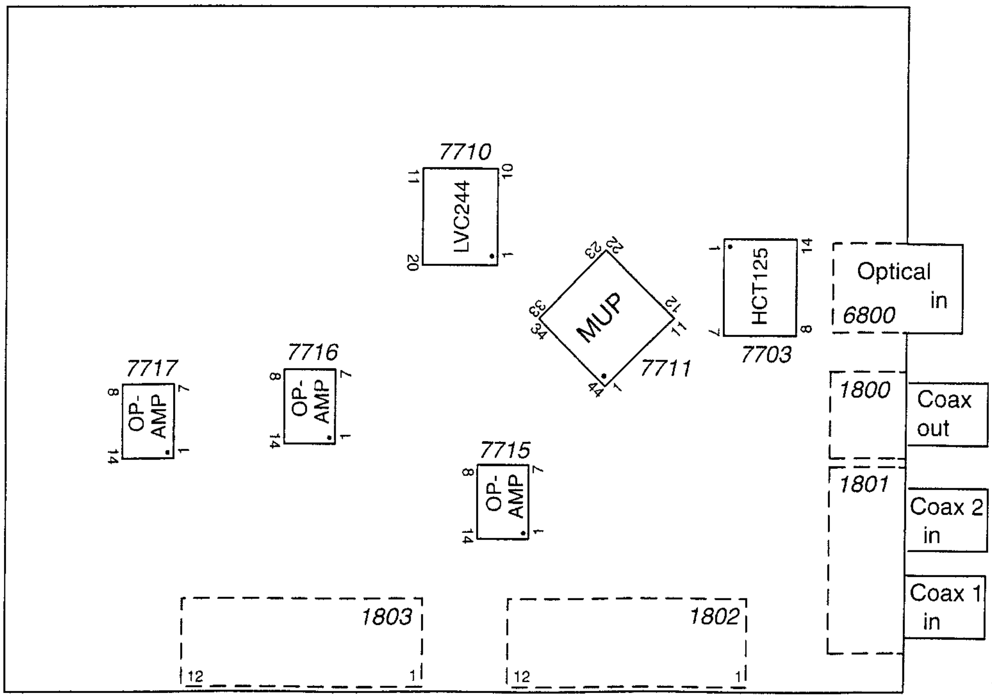
1003	3104 217 06780	MDM MODULE for FR965
1701	4822 252 51172	FUSE 0,315A
1702	4822 252 51172	FUSE 0,315A
1704	2422 543 01118	CRYSTAL 16MHZ
1705	2422 543 01132	CRYSTAL 12MH28
1800	4822 267 31729	COAX OUT CONN.
1801	4822 267 31448	COAX IN CONNECTOR
1802	2422 025 10253	CON 12P. MALE
1803	2422 025 10253	CON 12P. MALE
2702	4822 123 14025	16V 2200U 20%
6800	4822 218 11487	CONN. FIBER-GLASS GP1F32R
7701	9322 146 09687	LF50CV
7702	4822 209 16978	LF33CV

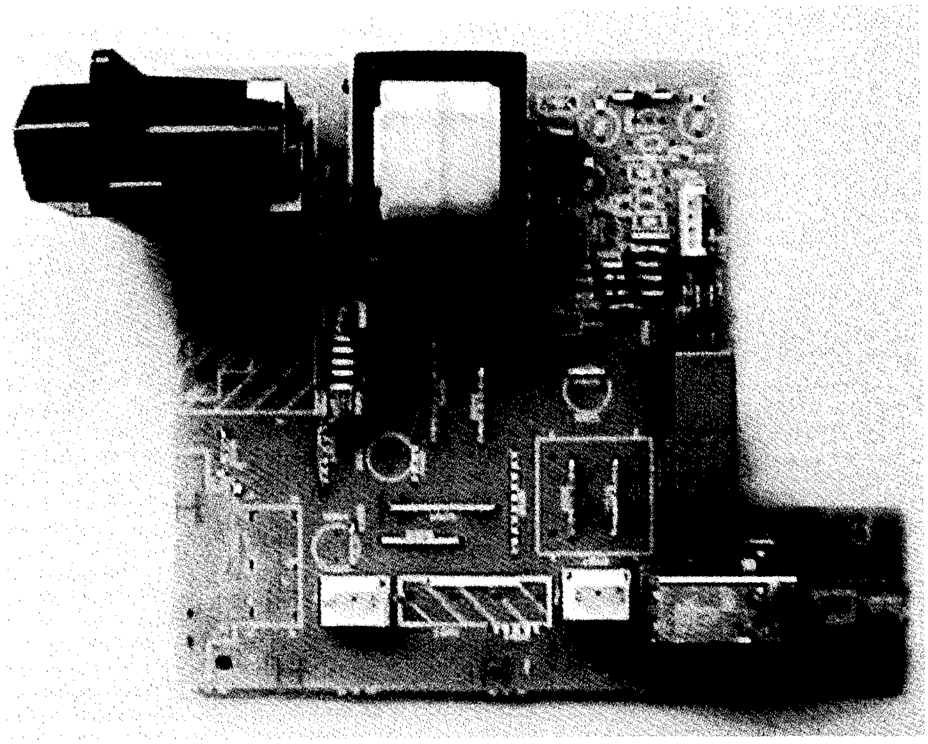
Note: Only the parts mentioned in this list are normal service parts.

Component side view


out
gnd
in
LF33CV
7702
1702
1704
XTAL
Optical in
6800
108
7705
73
72
109
DSP56362
144
1
36
37
7708
28
15
SRAM
1
14
7707
7709
7706
16
1
EPROM
17
32
12
1
AK 4324
7714
13
24
Coax out
1800
1705
XTAL
5701
AK 4110
7712
28
14
15
11
1
AK 4527
7713
12
44
22
34
23
33
Coax 2 in
1801
Coax 1 in
7701
LF50CV
out
gnd
in
2702
1701
1802
1803
1
12

Copper side view


7710
LVC244
11
10
20
1
MUP
7711
22
23
33
34
12
11
44
1
HCT125
7703
1
14
7
8
Optical in
6800
1800
Coax out
1801
Coax 2 in
Coax 1 in
7717
7716
7715
OP-AMP
8
7
14
1
1803
1802
12
1

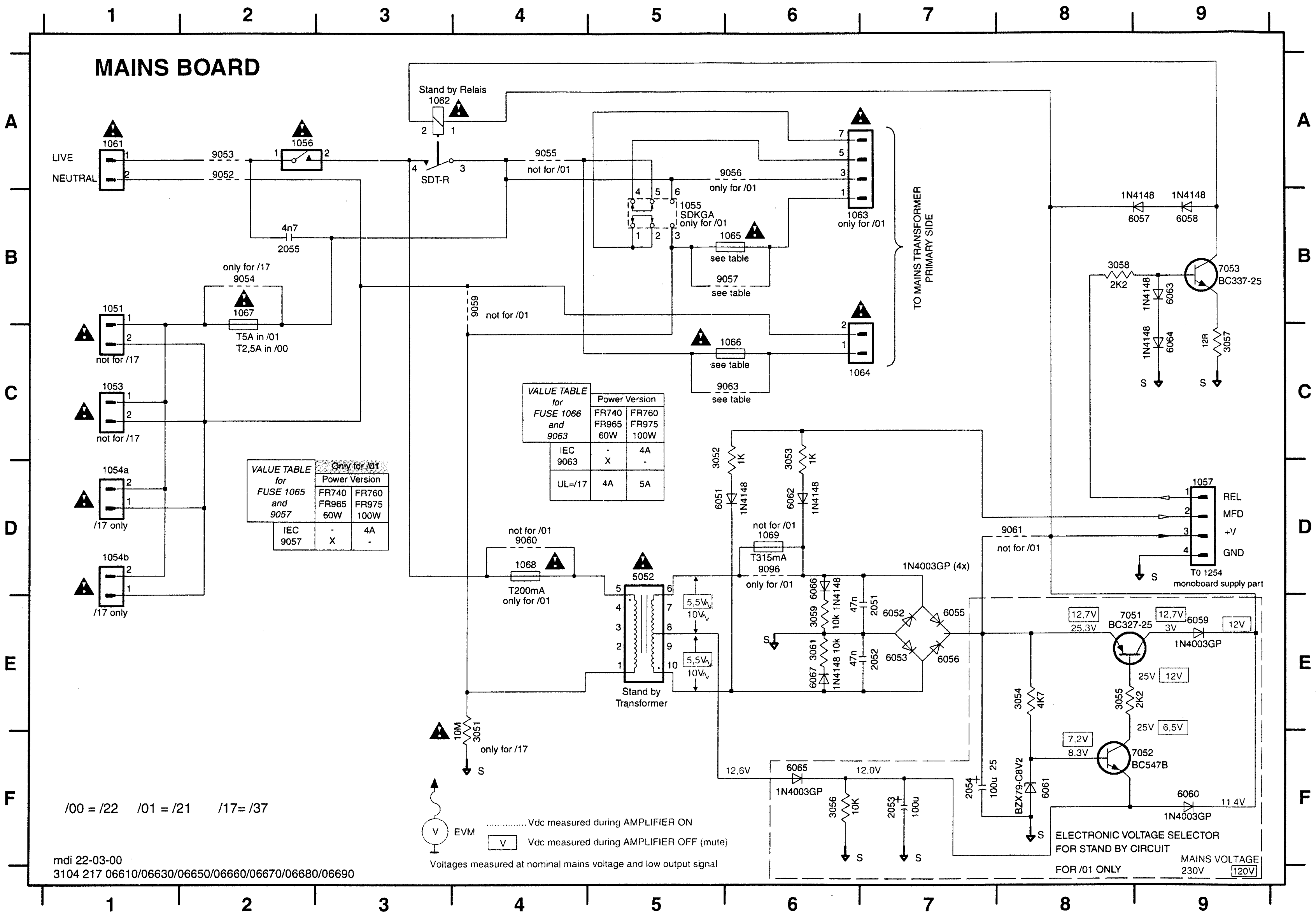


MAINS BOARD

TABLE OF CONTENTS

Circuit diagram 9-2
Component layout 9-3
Partslist 9-5

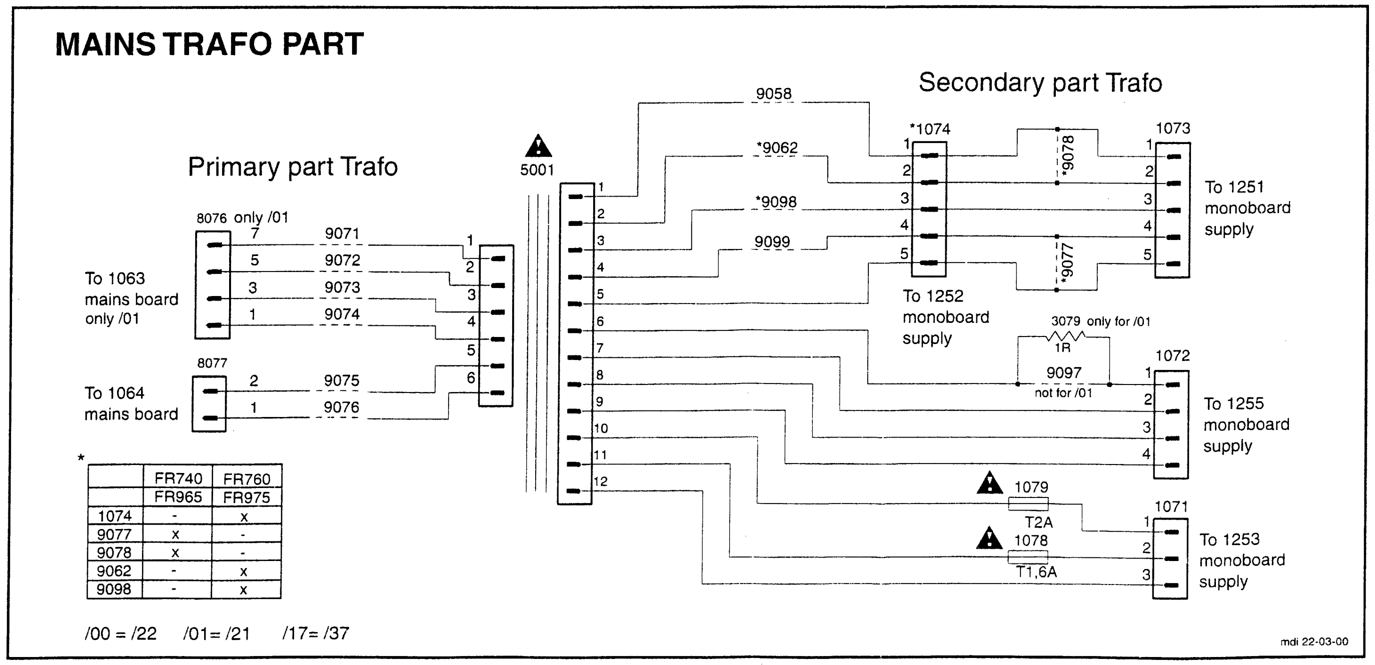
MAINS BOARD - CIRCUIT DIAGRAM


MAINS BOARD
1 2 3 4 5 6 7 8 9
A B C D E F
LIVE
NEUTRAL
1061
9053
9052
1056
Stand by Relais
1062
SDT-R
9055
not for /01
9056
only for /01
1055
SDKGA
only for /01
1065
see table
9057
see table
1063
only for /01
TO MAINS TRANSFORMER PRIMARY SIDE
4n7
2055
only for /17
9054
1067
T5A in /01
T2,5A in /00
1051
not for /17
1053
not for /17
1054a
/17 only
1054b
/17 only
9059
not for /01
1066
see table
9063
see table
1064
3052
1K
3053
1K
6051
1N4148
6062
1N4148
not for /01
1069
T315mA
9096
only for /01
not for /01
9060
1068
T200mA
only for /01
5052
5,5V
10V
Stand by Transformer
3059
10k
3061
10k
6066
1N4148
6067
1N4148
47n
2051
2052
6052
6053
6055
6056
1N4003GP (4x)
1N4148
6057
1N4148
6058
3058
2K2
6063
6064
7053
BC337-25
12R
3057
1057
REL
MFD
+V
GND
To 1254 monoboard supply part
9061
not for /01
12,7V
25,3V
7051
BC327-25
12,7V
3V
6059
12V
1N4003GP
25V
12V
3054
4K7
3055
2K2
25V
6,5V
7,2V
8,3V
7052
BC547B
6060
11,4V
1N4003GP
12,6V
6065
1N4003GP
12,0V
3056
10K
2053
100u
2054
100u 25
BZX79-C8V2
6061
ELECTRONIC VOLTAGE SELECTOR FOR STAND BY CIRCUIT
FOR /01 ONLY
MAINS VOLTAGE
230V
120V
3051
10M
only for /17
EVM
Vdc measured during AMPLIFIER ON
Vdc measured during AMPLIFIER OFF (mute)
Voltages measured at nominal mains voltage and low output signal
/00 = /22 /01 = /21 /17= /37
mdi 22-03-00
3104 217 06610/06630/06650/06660/06670/06680/06690

VALUE TABLE for FUSE 1065 and 9057	Only for /01 Power Version FR740 FR965 60W	FR760 FR975 100W
IEC	-	4A
9057	X	-

VALUE TABLE for FUSE 1066 and 9063	Power Version FR740 FR965 60W	FR760 FR975 100W
IEC	-	4A
9063	X	-
UL=/17	4A	5A

0051	D9
1051	B1
1052	D1
1053	C1
1054	D1
1055	B5
1056	A2
1057	D9
1061	A1
1062	A3
1063	B6
1064	C6
1065	B6
1066	C6
1067	B2
1068	D4
1069	D6
2051	E7
2052	E7
2053	F7
2054	F7
2055	B2
3051	F4
3052	C6
3053	C6
3054	E8
3055	E8
3056	F6
3057	C9
3058	B8
3059	E6
3061	E6
5051	A2
5052	D5
6051	D6
6052	E7
6053	E6
6055	E7
6056	E7
6057	B9
6058	B9
6059	E9
6060	F9
6061	F8
6062	D6
6063	B9
6064	C9
6065	F6
6066	D6
6067	E7
7051	E8
7052	F8
7053	B9
9051	A2
9052	A2
9053	A2
9054	B2
9055	A4
9056	A6
9057	B5
9059	B4
9060	D4
9061	D8
9063	C6
9064	A5
9065	B1
9066	B1
9092	E2
9093	E2
9094	F2
9095	F2
9096	D6

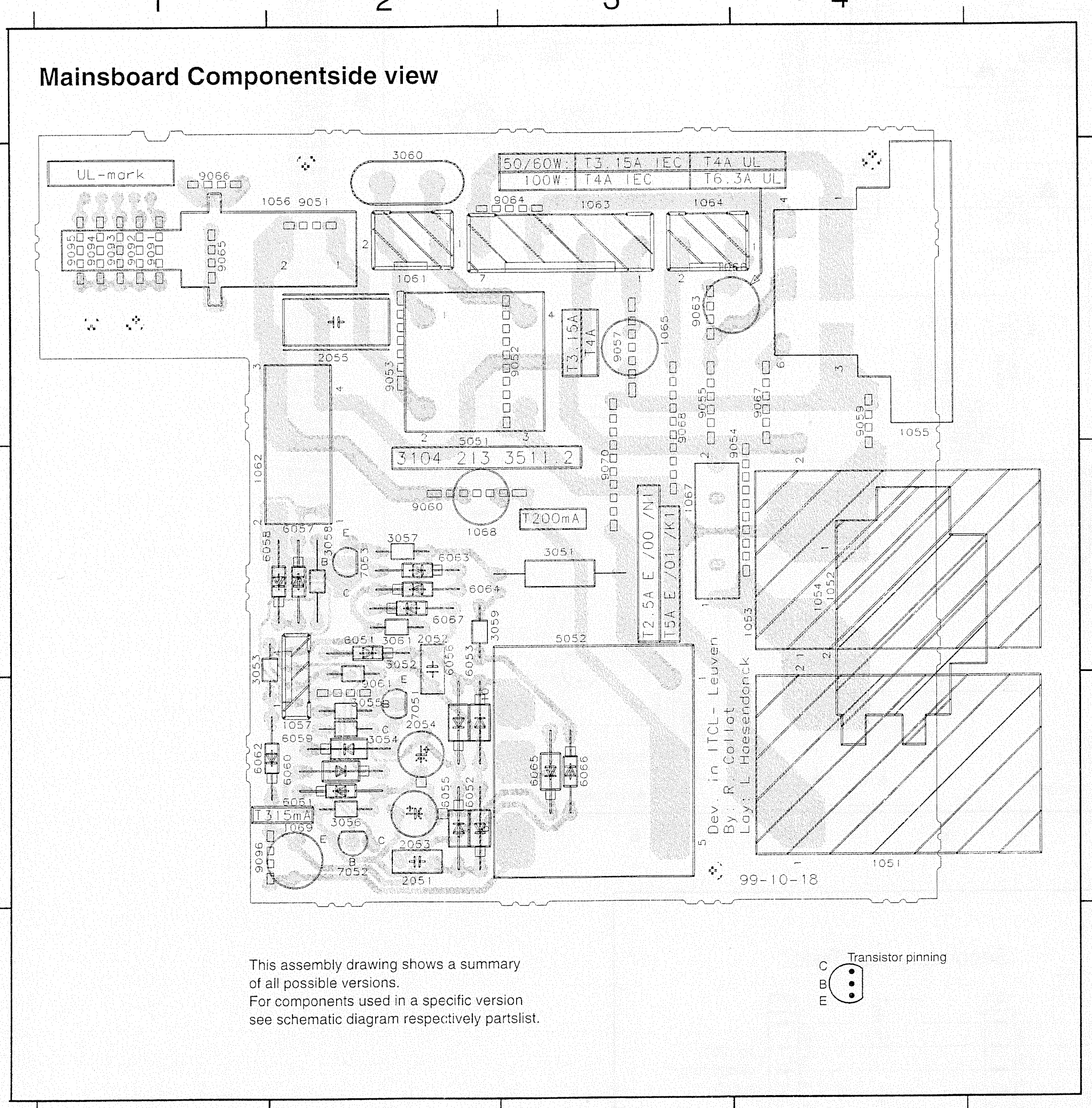

MAINS TRAFO PART
Primary part Trafo
Secondary part Trafo
To 1063 mains board only /01
8076 only /01
9071
9072
9073
9074
To 1064 mains board
8077
9075
9076
5001
9058
*9062
*9098
9099
*1074
*9078
*9077
1073
To 1251 monoboard supply
To 1252 monoboard supply
3079 only for /01
1R
9097
not for /01
1072
To 1255 monoboard supply
1079
T2A
1078
T1,6A
1071
To 1253 monoboard supply
mdi 22-03-00

*

	FR740 FR965	FR760 FR975
1074	-	x
9077	x	-
9078	x	-
9062	-	x
9098	-	x

/00 = /22 /01= /21 /17= /37

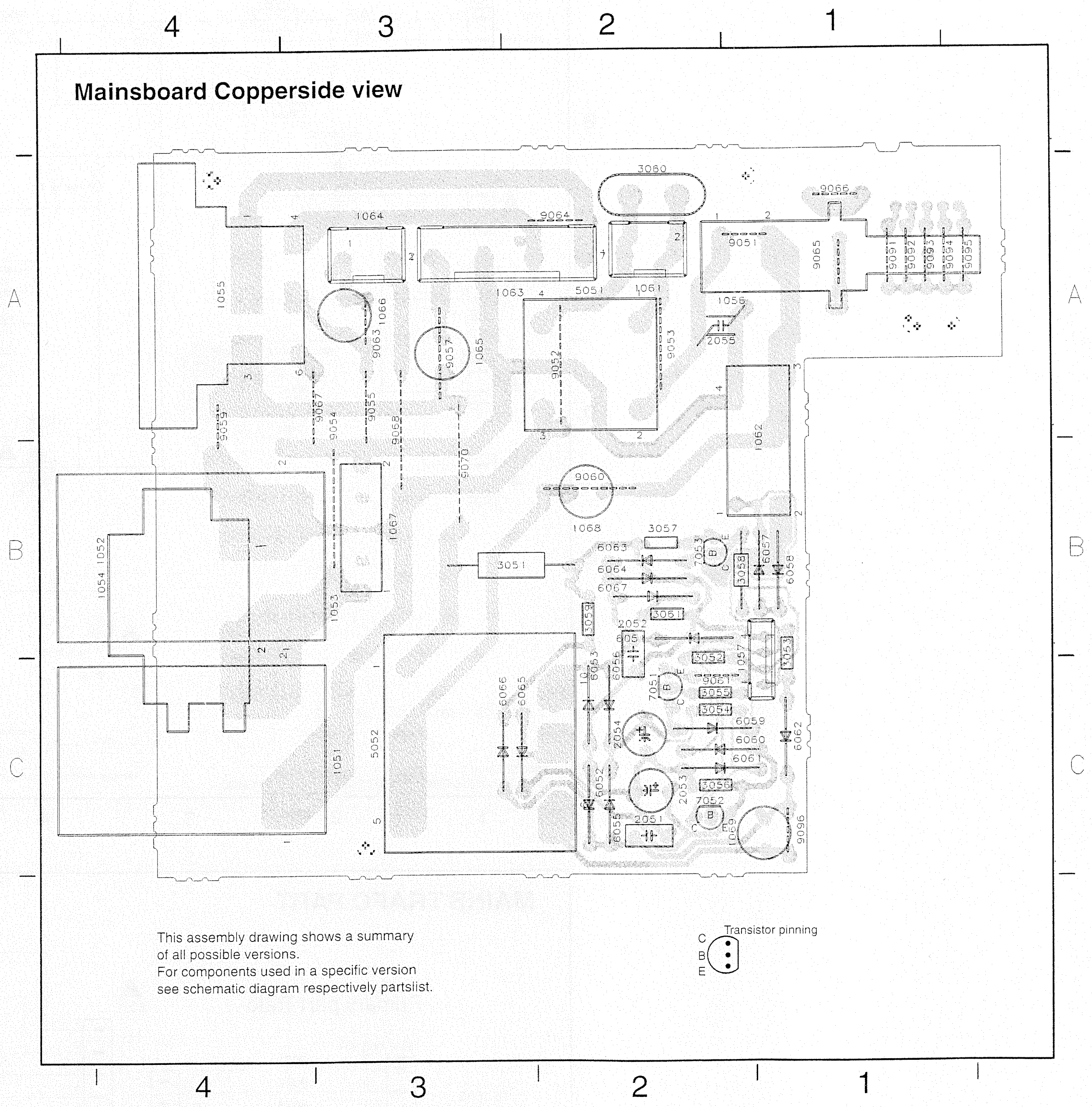
MAINS BOARD - COMPONENTSIDE VIEW & COPPERSIDE VIEW


Mainsboard Componentside view
1
2
3
4
A
B
C
UL-mark
9066
1056 9051
3060
50/60W
T3.15A IEC
T4A UL
100W
T4A IEC
T6.3A UL
9064
1063
1064
1061
9065
2055
9053
9052
T3.15A
T4A
9057
1065
9063
9055
9068
9067
9054
9059
1055
5051
3104 213 3511 2
1062
9060
9070
T200mA
1068
1067
T2.5A E /00 /N1
T5A E /01 /K1
1053
1054
1052
3057
6063
3051
6064
6067
3059
5052
6051
3061
2052
6053
6056
3052
3053
1057
6058
7051
2054
6062
6060
6061
6065
6066
6055
6052
T315mA
1059
9096
7052
3056
2053
2051
1051
Dev. in ITCL- Leuven
By: R. Colliot
Lay: L. Hoesendonck
99-10-18

This assembly drawing shows a summary
of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

Transistor pinning
C
B
E

1051	C4
1052	B4
1053	B4
1054	B4
1055	A4
1056	A2
1057	C2
1061	A2
1062	A2
1063	A3
1064	A3
1065	A3
1066	A3
1067	B3
1068	B2
1069	C2
2051	C2
2052	B2
2053	C2
2054	C2
2055	A2
3051	B3
3052	B2
3053	B2
3054	C2
3055	C2
3056	C2
3057	B2
3058	B2
3059	B2
3060	A2
3061	B2
5051	A2
5052	C3
6051	B2
6052	C2
6053	C2
6055	C2
6056	C2
6057	B2
6058	B2
6059	C2
6060	C2
6061	C2
6062	C2
6063	B2
6064	B2
6065	C3
6066	C3
6067	B2
7051	C2
7052	C2
7053	B2
9051	A2
9052	A3
9053	A2
9054	B4
9055	A3
9057	A3
9059	A4
9060	B2
9061	C2
9063	A3
9064	A3
9065	A1
9066	A1
9067	A4
9068	A3
9070	B3
9091	A1
9092	A1
9093	A1
9094	A1
9095	A1
9096	C2


Mainsboard Copperside view
4
3
2
1
A
B
C
3060
9066
1064
9064
9051
9065
1055
1063
5051
1061
1056
9063
1066
9057
1065
9052
9053
2055
9059
9067
9054
9055
9068
9070
1062
9060
1068
3057
1054 1052
1067
3051
6063
6064
6067
7053
3058
6057
6058
1053
3059
3061
6051
6056
6053
3052
3053
6066
6065
7051
3055
3054
6059
6060
6061
6062
1051
5052
2054
6052
2053
3056
7052
6055
2051
9096

This assembly drawing shows a summary
of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

Transistor pinning
C
B
E

ELECTRICAL PARTSLIST - MAINS BOARD

MISCELLANEOUS

1051	▲	4822 267 31994	MAINS OUTLET
1053	▲	4822 267 31994	MAINS OUTLET
1056	▲	4822 276 13224	MAINS SWITCH
1061	▲	4822 265 20723	MAINS INLET
1062		4822 280 10391	RELAY
1064	▲	4822 265 20723	B2P3-VH
1067	▲	2422 086 10912	FUSE 2,50A
1069	▲	4822 071 53151	FUSE 315MA
1078	▲	4822 071 51602	FUSE 1.6A
1079	▲	4822 071 52002	FUSE 2A

CAPACITORS

2051		4822 121 43526	47NF 5% 250V
2052		4822 121 43526	47NF 5% 250V
2055	▲	4822 126 14084	4,7NF 20% 250V

RESISTORS

3052	4822 050 11002	1K00 1% 0,4W
3053	4822 050 11002	1K00 1% 0,4W
3057	4822 052 10129	12R00 5% 0,33W
3058	4822 116 52256	2K2 5% 0,5W
3059	4822 050 21003	10K00 1% 0,6W
3061	4822 050 21003	10K00 1% 0,6W

TRAFO

5052	▲	4822 146 11143	STBY TRAFO

DIODES

6051	4822 130 30621	1N4148
6052	4822 130 31878	1N4003G
6053	4822 130 31878	1N4003G
6055	4822 130 31878	1N4003G
6056	4822 130 31878	1N4003G
6057	4822 130 30621	1N4148
6058	4822 130 30621	1N4148
6062	4822 130 30621	1N4148
6063	4822 130 30621	1N4148
6064	4822 130 30621	1N4148
6066	4822 130 30621	1N4148
6067	4822 130 30621	1N4148

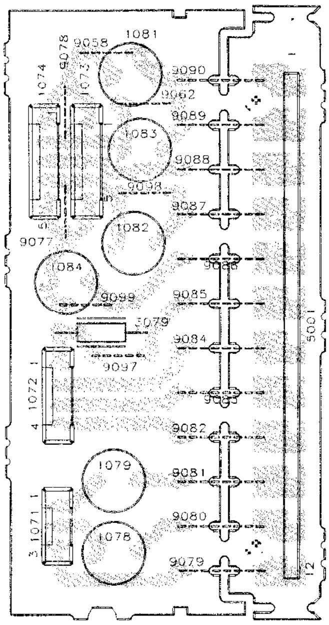
TRANSISTORS

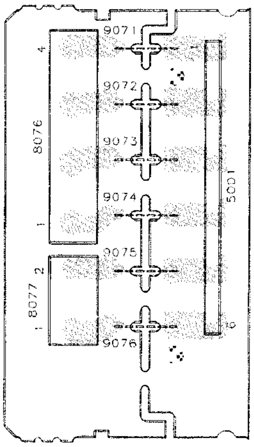
7053	4822 130 40981	BC337-25

TRAFO BOARD

Copperside view

Interconnection Board
Transformer secondary

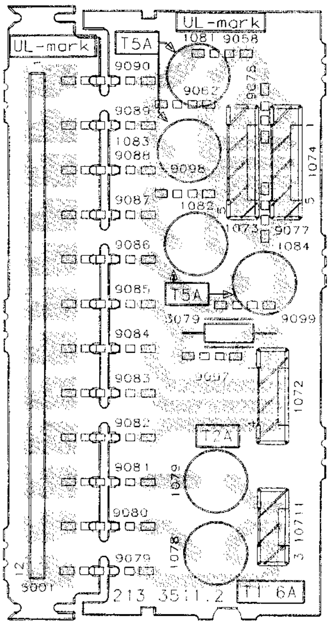

1081
9058
9078
1074
1073
9090
9062
9089
1083
9088
9098
9087
9077
1082
1084
9099
9085
3079
9084
9097
1072
9083
9082
1079
9081
1071
9080
1078
9079
5001
12

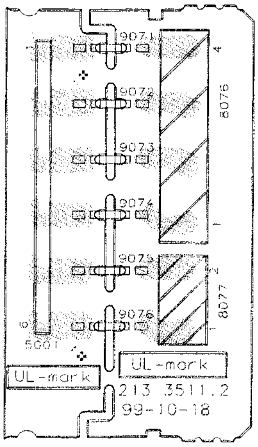

9071
9072
9073
9074
9075
9076
8076
8077
5001

Interconnection Board
Transformer primary

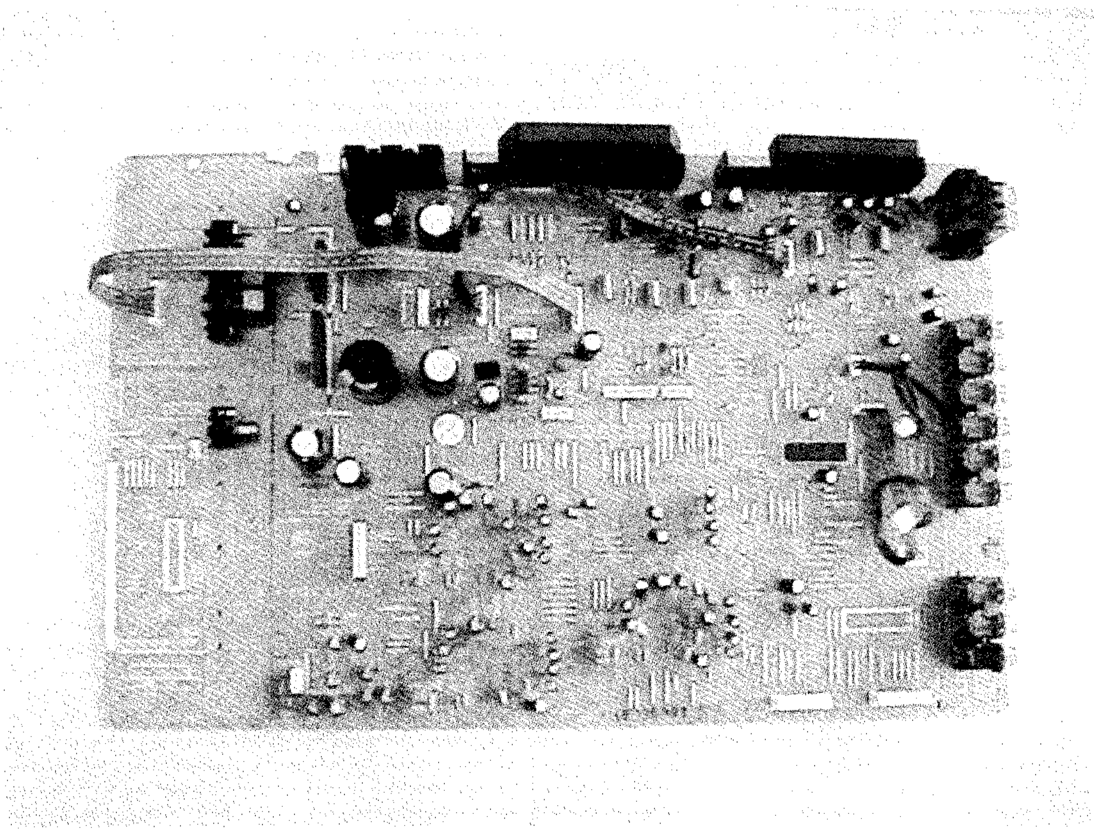
Componentside view

Interconnection Board
Transformer secondary


UL-mark
UL-mark
T5A
1081
9058
9090
9062
9078
9089
1083
9088
9098
1074
9087
1082
1073
9077
9086
1084
9085
T5A
3079
9099
9084
9097
9083
1072
9082
T2A
9081
1079
9080
1071
1078
9079
5001
12
213 3511.2
T1 6A


9071
9072
9073
9074
9075
9076
8076
8077
5001
UL-mark
UL-mark
213 3511.2
99-10-18

Interconnection Board
Transformer primary



MONO2 BOARD

TABLE OF CONTENTS

Measurement hint 10-2
P50/Speaker/Video Selector layout 10-3
Circuit diagram Source selector 10-4
Circuit diagram Volume controle 10-5
Circuit diagram Supply 10-6
Circuit diagram Amplifier 10-7
Component layout 10-8
Mappings Components & Chips side....................... 10-9
Component layout copper side view 10-10

MEASUREMENT REFERENCES TO LAYOUT ON PAGE 10-8

IC7643

IC 7643 Pin	Can be measure via Test point on component side monoboard	Funtionality
17	TP 47	MDM Surround L in
18	TP 48	6 CH Surround L in
9	TP 50	MDM Surround R in
10	TP 51	6 CH Surround R in
3	TP 52	4,7V
2	TP 53	4,7V
4	TP 54	4,7V
26	TP 55	4,7V
27	TP 56	4,7V
33	TP 57	Surround Right out
36/40/43	TP 58	Ground
41/42	TP 59	9,4V
39	TP 60	4,7V
19	TP 61	8,7V
34	TP 63	Surround Left out
25	TP 64	4,7V
24	TP 65	4,7V
12	TP 66	4,7V
20	TP 67	4,7V
21	TP 68	4,7V

IC7504

IC 7504 Pin	Can be measure via Test point on component side monoboard	Funtionality
5 via R3614	TP 77	Rec - in Right
4	TP 78	-13,5V
7 via R3616	TP 79	Rec - out Right
8	TP 80	12V
3 via R3613	TP 81	Rec - in Left
1 via R3615	TP 82	Rec - out Left

MEASUREMENT REFERENCES TO LAYOUT ON PAGE 10-8

IC7641

IC 7641 Pin	Can be measure via Test point on component side monoboard	Funtionality
16	TP 1	Left in
17	TP 2	MDM Left in
18	TP 3	6 CH Front left in
8	TP 4	Right in
9	TP 5	MDM Right in
10	TP 6	6 CH Front Right in
3	TP 7	4,7V
2	TP 8	4,7V
4	TP 9	4,7V
26	TP 10	4,7V
27	TP 11	4,7V
33	TP 12	Right out
36/40/43	TP 13	Ground
41/42	TP 14	9,4V
39	TP 15	4,7V
19	TP 16	8,7V
34	TP 18	Left out
25	TP 19	4,7V
24	TP 20	4,7V
12	TP 21	4,7V
20	TP 22	4,7V
21	TP 23	4,7V

IC7642

IC 7642 Pin	Can be measure via Test point on component side monoboard	Funtionality
16	TP 24	4,7V
17	TP 25	MDM Center in
18	TP 26	6 CH Center in
8	TP 27	MDM Subwoofer in
9	TP 28	MDM Subwoofer in
10	TP 29	6 CH Subwoofer in
3	TP 30	4,7V
2	TP 31	4,7V
4	TP 32	4,7V
26	TP 33	4,7V
27	TP 34	4,7V
33	TP 35	Subwoofer out
36/43	TP 36	Ground
40/41/42	TP 37	9,4V
39	TP 38	4,7V
19	TP 39	8,7V
34	TP 40	Center out
25	TP 41	4,7V
24	TP 42	4,7V
12	TP 43	4,7V
20	TP 44	4,7V
21	TP 45	4,7V

IC7601

IC 7601 Pin	Can be measure via Test point on component side monoboard	Funtionality
5	TP 69	Headphone Amp L in
4	TP 70	-13,5V
8	TP 71	12V
3	TP 72	Headphone Amp R in

Tr 7622

Tr7622	Can be measure via Test point on component side monoboard	Funtionality
B	TP 99	-0,5V
C	TP 100	Ground
E	TP 101	Headphone Amp R out

IC7503

IC 7503 Pin	Can be measure via Test point on component side monoboard	Funtionality
5	TP 73	Right in
4	TP 74	-12V
8	TP 75	11V
3	TP 76	Left in

Tr 7653

Tr7653	Can be measure via Test point on component side monoboard	Funtionality
B	TP 86	-1,8V
E	TP 88	Center mute

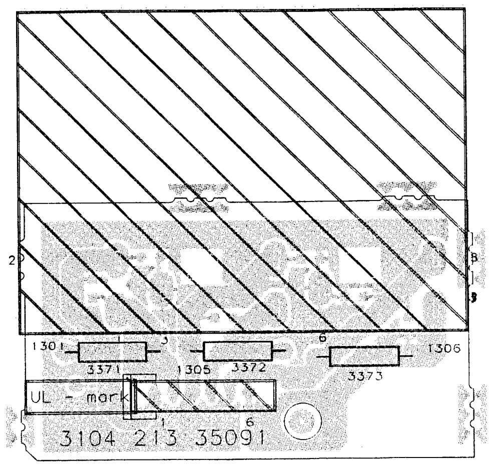
Tr 7621

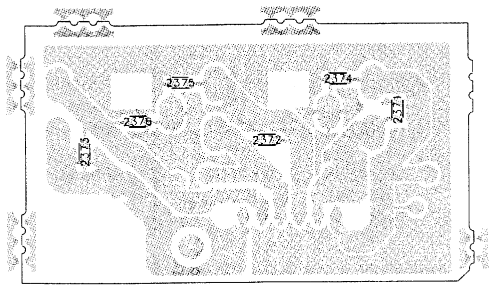
Tr7621	Can be measure via Test point on component side monoboard	Funtionality
B	TP 96	-1,5V
C	TP 97	Ground
E	TP 98	Headphone Amp L out

Tr 7658

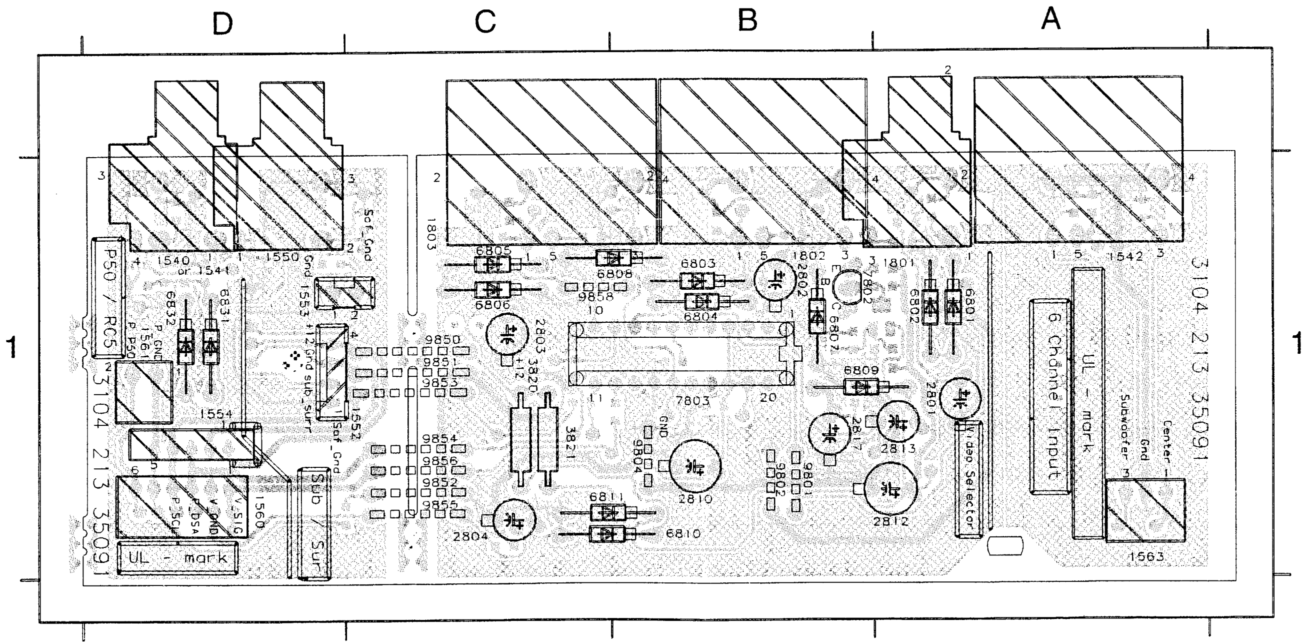
Tr7658	Can be measure via Test point on component side monoboard	Funtionality
B	TP 83	5V
C	TP 84	-13V
E	TP 85	5V

SCREW TERMINAL BOARD - COMPONENT VIEW & COPPER SIDE VIEW

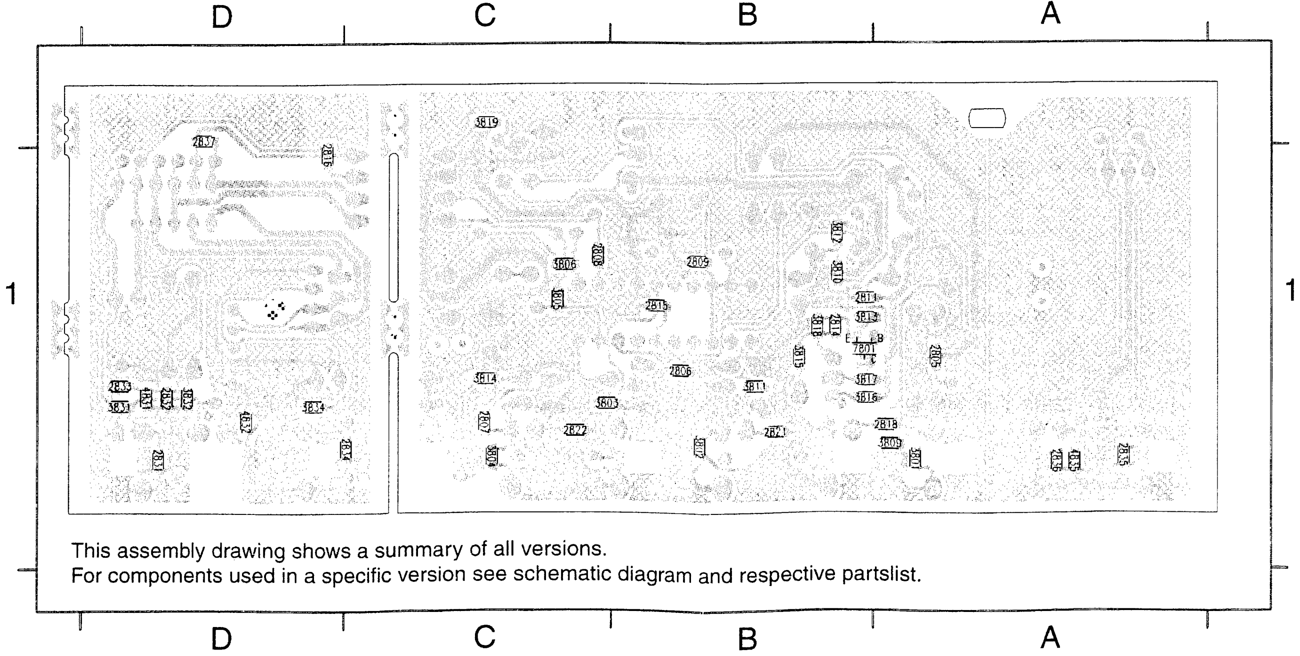

1301
3371
1305
3372
1306
3373
UL - mark
3104 213 35091


2375
2374
2376
2372
2373
2371

P50/RC5 VIDEO SELECTOR BOARD - COMPONENT VIEW & COPPER SIDE VIEW


D
C
B
A
1
P50 / RC5
3104 213 35091
UL - mark
6 Channel Input
Video Selector
Subwoofer
Center
Gnd
1540
1541
1550
1542
1552
1553
1554
1560
1561
1563
1801
1802
1803
7803
6803
6804
6805
6806
6807
6808
6809
6810
6811
2801
2802
2803
2804
2810
2812
2813
2817
3820
3821

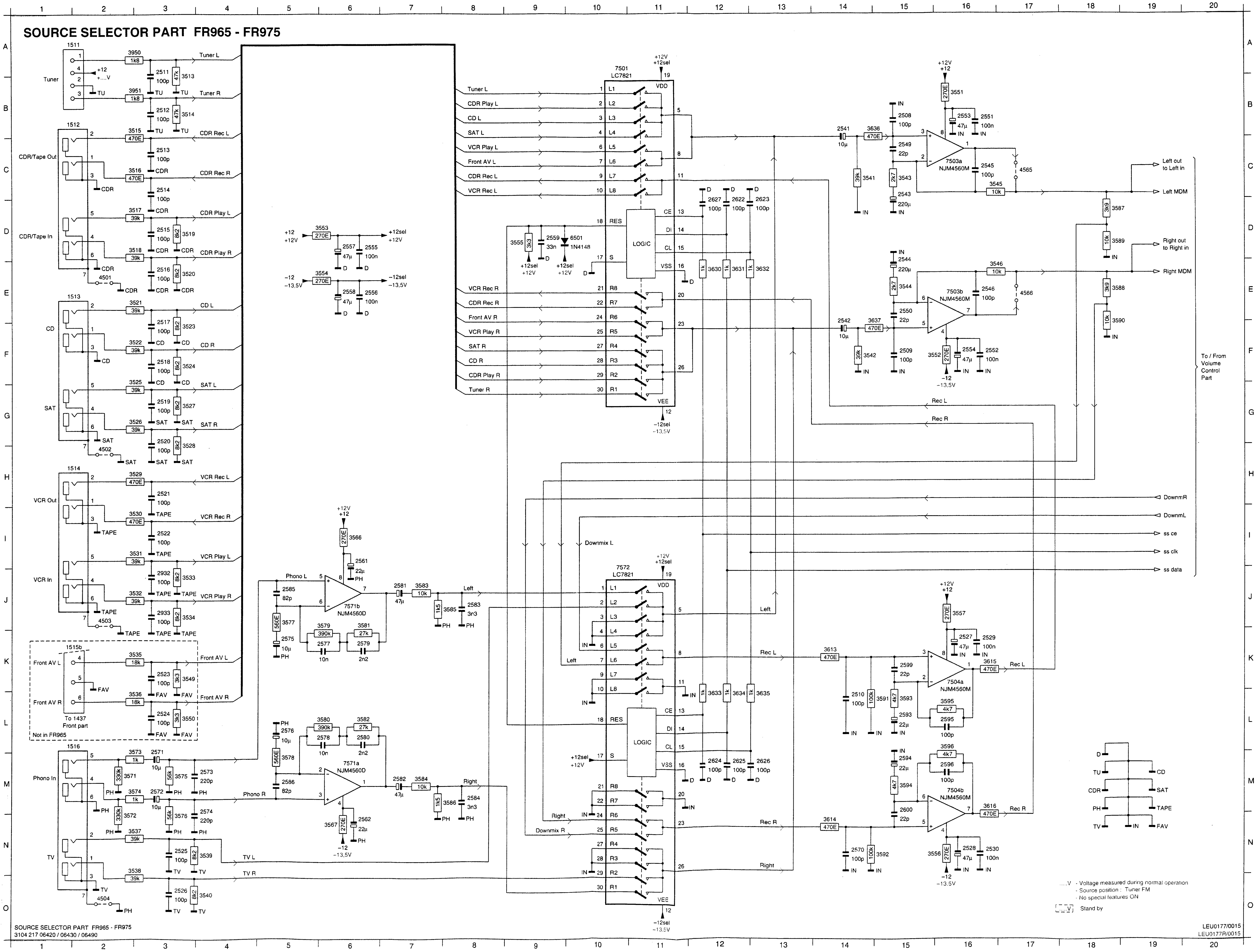
1540	D1
1541	D1
1542	A1
1550	D1
1552	D1
1553	D1
1554	D1
1560	D1
1561	D1
1563	A1
1801	A1
1802	B1
1803	C1
2801	A1
2802	B1
2803	C1
2804	C1
2810	B1
2812	A1
2813	A1
2817	B1
3820	C1
3821	C1
6801	A1
6802	A1
6803	B1
6804	B1
6805	C1
6806	C1
6807	B1
6808	B1
6809	B1
6810	C1
6811	C1
6831	D1
6832	D1
7802	B1
7803	B1
9801	B1
9802	B1
9804	B1
9850	C1
9851	C1
9852	C1
9853	C1
9854	C1
9855	C1
9856	C1
9858	C1



This assembly drawing shows a summary of all versions.
For components used in a specific version see schematic diagram and respective partslist.

2805	A1
2806	B1
2807	C1
2808	B1
2809	B1
2811	A1
2814	B1
2815	B1
2816	C1
2818	A1
2821	B1
2822	C1
2831	D1
2832	D1
2833	D1
2834	C1
2835	A1
2836	A1
2837	D1
3801	A1
3802	B1
3803	B1
3804	C1
3805	C1
3806	C1
3809	A1
3810	B1
3811	B1
3812	B1
3813	A1
3814	C1
3815	B1
3816	A1
3817	A1
3818	B1
3819	C1
3831	D1
3832	D1
3834	D1
4831	D1
4832	D1
4835	A1
7801	A1

SOURCE SELECTOR PART FR965 - FR975


1511
Tuner
Tuner L
Tuner R
1512
CDR/Tape Out
CDR/Tape In
CDR Rec L
CDR Rec R
CDR Play L
CDR Play R
1513
CD
CD L
CD R
SAT
SAT L
SAT R
1514
VCR Out
VCR In
VCR Rec L
VCR Rec R
VCR Play L
VCR Play R
1515b
Front AV L
Front AV R
To 1437 Front part
Not in FR965
1516
Phono In
TV
TV L
TV R
Phono L
Phono R
7501 LC7821
7572 LC7821
VDD
VEE
LOGIC
RES
CE
DI
CL
VSS
7503a NJM4560M
7503b NJM4560M
7504a NJM4560M
7504b NJM4560M
7571a NJM4560D
7571b NJM4560D
+12V +12sel
-12sel -13,5V
6501 1N4148
Left out to Left in
Left MDM
Right out to Right in
Right MDM
To / From Volume Control Part
Rec L
Rec R
DownmR
DownmL
Downmix L
Downmix R
ss ce
ss clk
ss data
Left
Right
4501
4502
4503
4504
4565
4566
D
TU
CDR
PH
TV
CD
SAT
TAPE
IN
FAV

.....V - Voltage measured during normal operation
- Source position : Tuner FM
- No special features ON

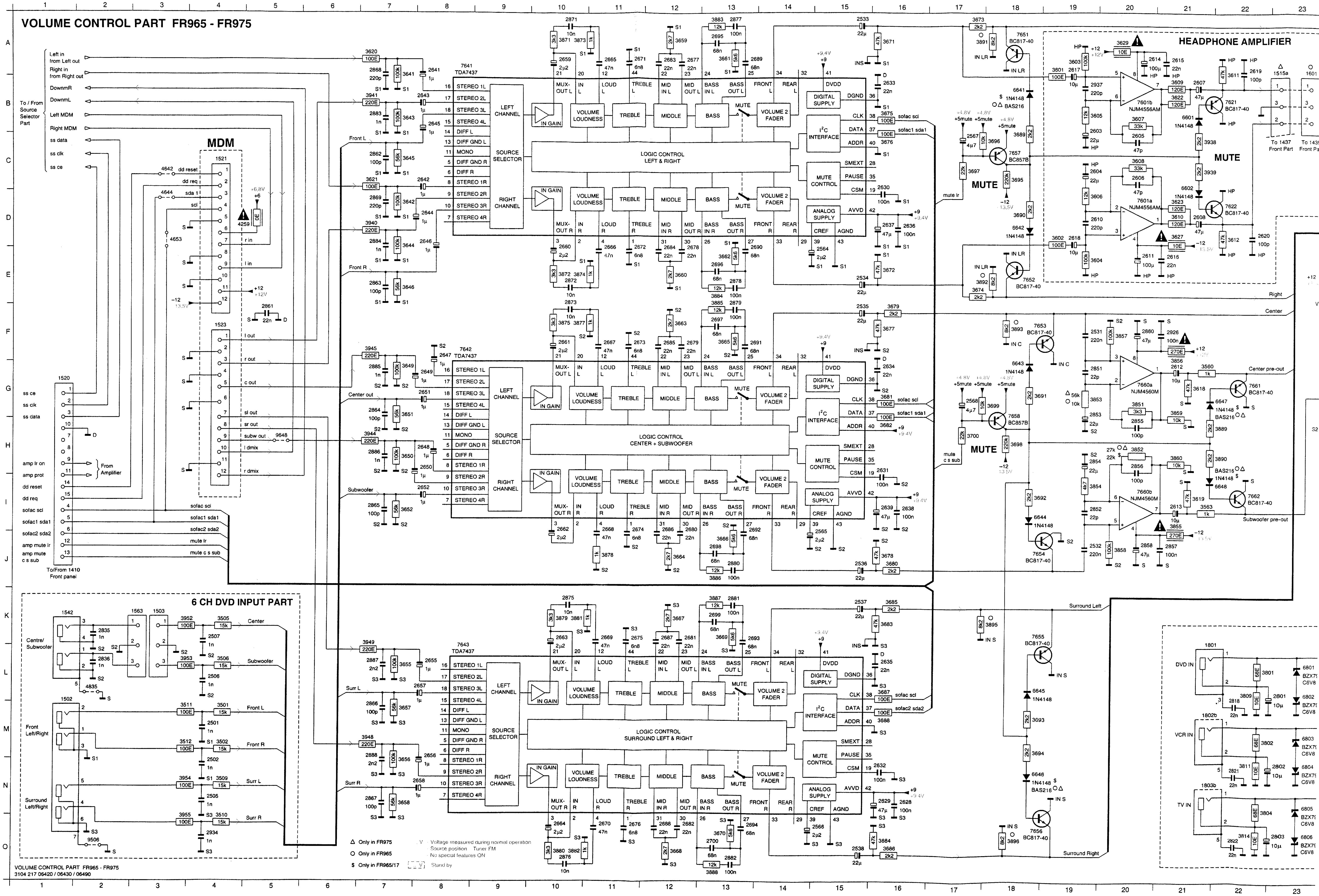
.....V Stand by

SOURCE SELECTOR PART FR965 - FR975
3104 217 06420 / 06430 / 06490

LEU0177/0015
LEU0177R/0015

1511	A1	3557	J16
1512	B1	3566	I6
1513	E1	3567	N6
1514	H1	3571	M2
1515b	K1	3572	N2
1516	L1	3573	M2
2508	B15	3574	M2
2509	F15	3575	M3
2510	L14	3576	N3
2511	A3	3577	J5
2512	B3	3578	M5
2513	C3	3579	J5
2514	C3	3580	L5
2515	D3	3581	J6
2516	E3	3582	L6
2517	F3	3583	J7
2518	F3	3584	M7
2519	G3	3585	J8
2520	G3	3586	M8
2521	H3	3587	D18
2522	I3	3588	E18
2523	K3	3589	D18
2524	L3	3590	F18
2525	N3	3591	L15
2526	O3	3592	N15
2527	K16	3593	L15
2528	N16	3594	M15
2529	K16	3595	L16
2530	N16	3596	L16
2541	B14	3613	K14
2542	F14	3614	N14
2543	C15	3615	K16
2544	E15	3616	M16
2545	C16	3630	E12
2546	E16	3631	E12
2549	C15	3632	E13
2550	E15	3633	L12
2551	B16	3634	L12
2552	F16	3635	L13
2553	B16	3636	B14
2554	F16	3637	F14
2555	D6	3950	A2
2556	E6	3951	B2
2557	D6	4501	E2
2558	E6	4502	H2
2559	D9	4503	J2
2561	I6	4504	O2
2562	N6	4565	C17
2570	N14	4566	E17
2571	M3	6501	D10
2572	M3	7501	A10
2573	M4	7503a	C16
2574	M4	7503b	E16
2575	K5	7504a	K16
2576	L5	7504b	M16
2577	K5	7571a	M6
2578	L5	7571b	J6
2579	K6	7572	J10
2580	L6		
2581	J7		
2582	M7		
2583	J8		
2584	M8		
2585	J5		
2586	M5		
2593	L15		
2594	M15		
2595	L16		
2596	M16		
2599	K15		
2600	M15		
2622	D12		
2623	D13		
2624	M12		
2625	M12		
2626	M13		
2627	D12		
2932	J3		
2933	J3		
3513	B3		
3514	B3		
3515	B2		
3516	C2		
3517	D2		
3518	D2		
3519	D3		
3520	E3		
3521	E2		
3522	F2		
3523	F3		
3524	F3		
3525	F2		
3526	G2		
3527	G3		
3528	H3		
3529	H2		
3530	I2		
3531	I2		
3532	J2		
3533	J3		
3534	J3		
3535	K2		
3536	L2		
3537	N2		
3538	N2		
3539	N4		
3540	O4		
3541	C14		
3542	F14		
3543	C15		
3544	E15		
3545	C16		
3546	E16		
3549	K3		
3550	L3		
3551	B16		
3552	F15		
3553	D5		
3554	E5		
3555	D9		
3556	N15		

VOLUME CONTROL PART FR965 - FR975


VOLUME CONTROL PART FR965 - FR975
To / From Source Selector Part
Left in from Left out
Right in from Right out
DownmR
DownmL
Left MDM
Right MDM
ss data
ss clk
ss ce
MDM
1521
1523
1520
To/From 1410 Front panel
From Amplifier
6 CH DVD INPUT PART
Centre/ Subwoofer
Front Left/Right
Surround Left/Right
7641 TDA7437
7642 TDA7437
7643 TDA7437
LEFT CHANNEL
RIGHT CHANNEL
SOURCE SELECTOR
LOGIC CONTROL LEFT & RIGHT
LOGIC CONTROL CENTER + SUBWOOFER
LOGIC CONTROL SURROUND LEFT & RIGHT
VOLUME LOUDNESS
TREBLE
MIDDLE
BASS
MUTE
VOLUME 2 FADER
DIGITAL SUPPLY
I²C INTERFACE
MUTE CONTROL
ANALOG SUPPLY
IN GAIN
HEADPHONE AMPLIFIER
MUTE
7601a NJM4556AM
7601b NJM4556AM
7660a NJM4560M
7660b NJM4560M
Center pre-out
Subwoofer pre-out
Surround Left
Surround Right
To 1437 Front Part
DVD IN
VCR IN
TV IN

△ Only in FR975

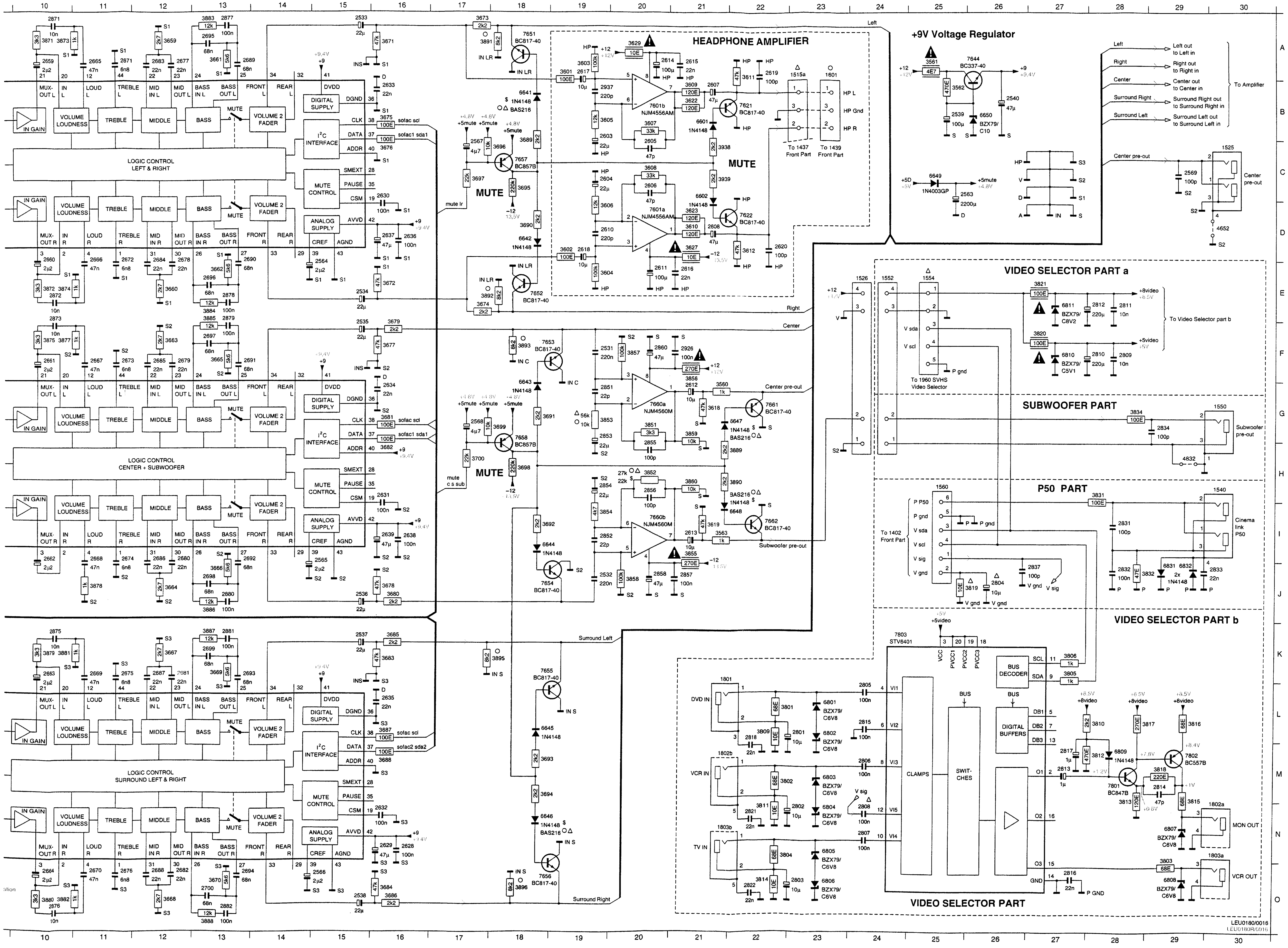
○ Only in FR965

$ Only in FR965/17

V Voltage measured during normal operation
Source position : Tuner FM
No special features ON

Stand by

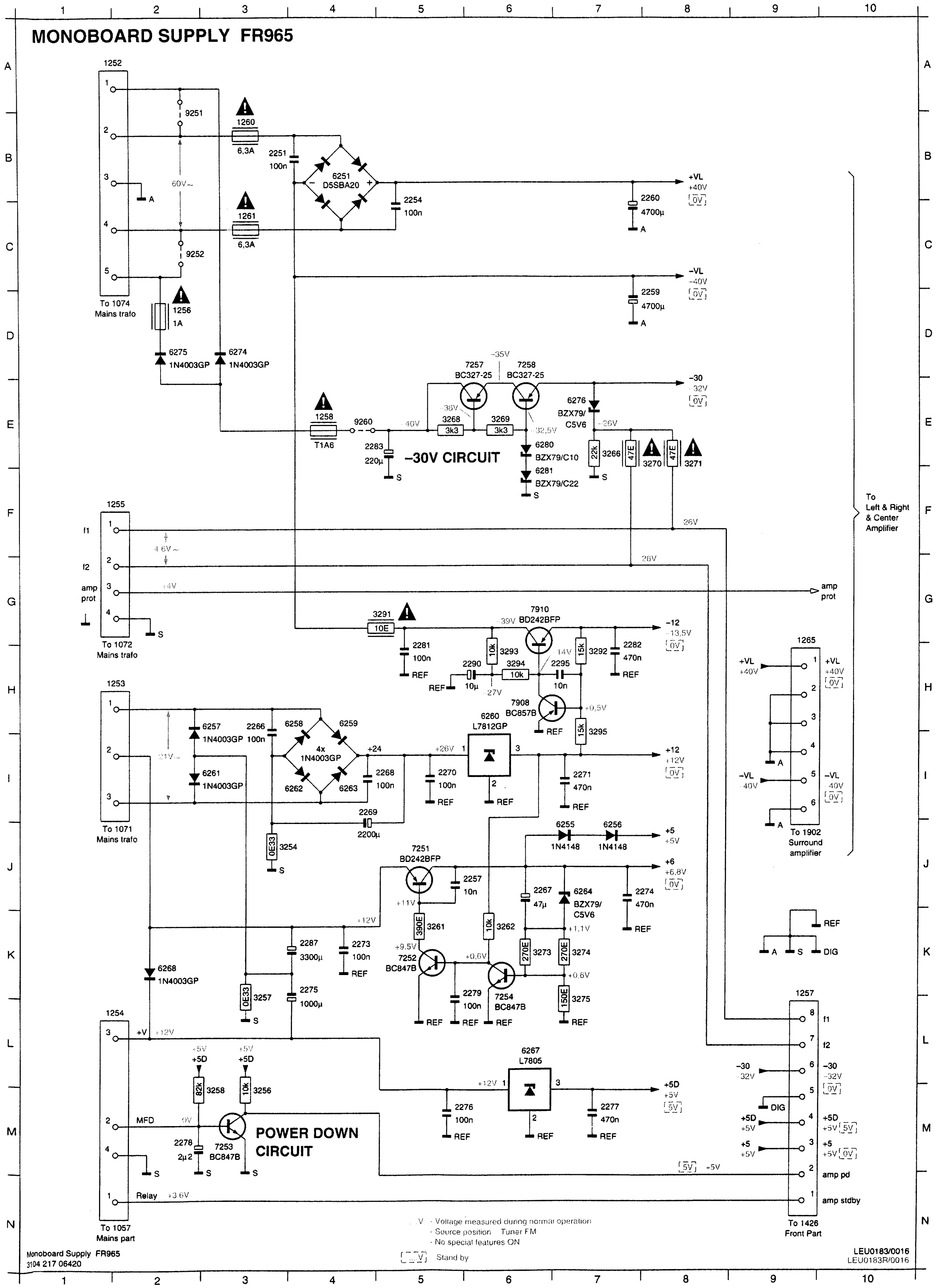
VOLUME CONTROL PART FR965 - FR975
3104 217 06420 / 06430 / 06490


HEADPHONE AMPLIFIER
MUTE
+9V Voltage Regulator
VIDEO SELECTOR PART a
SUBWOOFER PART
P50 PART
VIDEO SELECTOR PART b
VIDEO SELECTOR PART
LOGIC CONTROL LEFT & RIGHT
LOGIC CONTROL CENTER + SUBWOOFER
LOGIC CONTROL SURROUND LEFT & RIGHT
VOLUME LOUDNESS
TREBLE
MIDDLE
BASS
VOLUME 2 FADER
DIGITAL SUPPLY
I²C INTERFACE
MUTE CONTROL
ANALOG SUPPLY
IN GAIN
NJM4556AM
NJM4560M
BC817-40
BC857B
BC337-40
STV6401
CLAMPS
SWITCHES
BUS DECODER
DIGITAL BUFFERS
To Amplifier
Left out to Left in
Right out to Right in
Center out to Center in
Surround Right out to Surround Right in
Surround Left out to Surround Left in
Center pre-out
Subwoofer pre-out
Cinema link P50
HP L
HP Gnd
HP R
To 1437 Front Part
To 1439 Front Part
To 1960 SVHS Video Selector
To 1402 Front Part
To Video Selector part b
DVD IN
VCR IN
TV IN
MON OUT
VCR OUT
LEU0180/0016

1502	M1	2694	O13	3664	J12	6650	B26
1503	K3	2695	A13	3665	F13	6801	L23
1515a	A23	2696	E13	3666	J13	6802	L23
1520	G1	2697	F13	3667	K12	6803	M23
1521	C4	2698	J13	3668	O12	6804	N23
1523	F4	2699	K13	3669	K13	6805	N23
1525	C30	2700	O13	3670	O13	6806	O23
1526	E24	2801	L23	3671	A16	6807	N29
1540	H30	2802	N23	3672	E16	6808	O29
1542	K1	2803	O23	3673	A17	6809	M28
1550	G30	2804	J26	3674	E17	6810	F27
1552	E24	2805	L24	3675	B16	6811	E27
1554	E25	2806	M24	3676	C16	6831	J29
1560	H25	2807	N24	3677	F16	6832	J29
1563	K2	2808	N24	3678	J16	7601a	D20
1601	A23	2809	F28	3679	F16	7601b	B20
1801	K21	2810	F28	3680	J16	7621	B22
1802a	N30	2811	E28	3681	G16	7622	D22
1802b	M21	2812	E28	3682	H16	7641	A8
1803a	N30	2813	M27	3683	K16	7642	F8
1803b	N21	2814	M29	3684	O16	7643	L8
2501	M4	2815	L24	3685	K16	7644	A25
2502	N4	2816	O27	3686	O16	7651	A18
2505	N4	2817	M27	3687	L16	7652	E18
2506	L4	2818	L22	3688	M16	7653	F18
2507	K4	2821	N22	3689	C18	7654	J18
2531	F19	2822	O22	3690	D18	7655	K18
2532	J19	2831	I28	3691	G18	7656	O18
2533	A15	2832	J28	3692	I18	7657	C18
2534	E15	2833	J30	3693	M18	7658	G18
2535	F15	2834	G29	3694	M18	7660a	G20
2536	J15	2835	K2	3695	C18	7660b	I20
2537	K15	2836	L2	3696	C18	7661	G22
2538	O15	2837	J27	3697	C17	7662	I22
2539	B25	2851	G19	3698	H18	7801	M28
2540	B26	2852	I19	3699	G18	7802	M29
2563	C25	2853	G19	3700	H17	7803	K24
2564	E15	2854	H19	3801	L22	9506	O2
2565	J15	2855	H20	3802	M22	9648	H5
2566	O15	2856	H20	3803	N29		
2567	C17	2857	J21	3804	N22		
2568	G17	2858	J20	3805	K27		
2569	C29	2860	F20	3806	K27		
2603	B19	2861	F5	3809	L22		
2604	C19	2862	C7	3810	L28		
2605	C20	2863	E7	3811	N22		
2606	C20	2864	G7	3812	M28		
2607	B21	2865	I7	3813	N28		
2608	D21	2866	M7	3814	O22		
2610	D19	2867	N7	3815	N29		
2611	E20	2868	A7	3816	L29		
2612	G21	2869	D7	3817	L28		
2613	I21	2871	A10	3818	M29		
2614	A20	2872	E10	3819	J25		
2615	A21	2873	E10	3820	F27		
2616	E21	2875	K10	3821	E27		
2617	A19	2876	O10	3831	H28		
2618	D19	2877	A13	3832	J28		
2619	A22	2878	E13	3834	G28		
2620	D22	2879	E13	3851	G20		
2628	N16	2880	J13	3852	H20		
2629	N16	2881	K13	3853	G19		
2630	C16	2882	O13	3854	I19		
2631	H16	2883	B7	3855	I21		
2632	N16	2884	D7	3856	F21		
2633	B16	2885	G7	3857	F20		
2634	G16	2886	H7	3858	J20		
2635	L16	2887	L7	3859	G21		
2636	D16	2888	M7	3860	H21		
2637	D16	2926	F21	3871	A10		
2638	I16	2934	O4	3872	E10		
2639	I16	2937	B19	3873	A10		
2641	A8	3501	M4	3874	E10		
2642	C7	3502	M4	3875	F10		
2643	B7	3505	K4	3877	F10		
2644	D8	3506	L4	3878	J11		
2645	B8	3509	N4	3879	K10		
2646	D8	3510	O4	3880	O10		
2647	F8	3511	M3	3881	K10		
2648	H8	3512	M3	3882	O10		
2649	G8	3560	G21	3883	A13		
2650	H8	3561	A25	3884	E13		
2651	G8	3562	B25	3885	E13		
2652	I8	3563	I21	3886	J13		
2655	L8	3601	A19	3887	K13		
2656	M8	3602	D19	3888	O13		
2657	L7	3603	A19	3889	H22		
2658	N7	3604	E19	3890	H22		
2659	A10	3605	B19	3891	A17		
2660	E10	3606	D19	3892	E17		
2661	F10	3607	B20	3893	F18		
2662	I10	3608	C20	3895	K18		
2663	K10	3609	B21	3896	O18		
2664	O10	3610	D21	3938	C21		
2665	A11	3611	A22	3939	C21		
2666	E11	3612	D22	3940	D7		
2667	F11	3618	G21	3941	B7		
2668	I11	3619	I21	3944	H7		
2669	K11	3620	A7	3945	F7		
2670	O11	3621	C7	3948	M7		
2671	A11	3622	B21	3949	K7		
2672	E11	3623	D21	3952	K3		
2673	F11	3627	D21	3953	L3		
2674	I11	3629	A20	3954	N3		
2675	K11	3641	B7	3955	O3		
2676	O11	3642	D7	4259	D4		
2677	A12	3643	B7	4642	C3		
2678	E12	3644	E7	4644	D3		
2679	F12	3645	C7	4652	D30		
2680	I12	3646	E7	4653	D3		
2681	K12	3649	G7	4832	H29		
2682	O12	3650	H7	4835	L2		
2683	A12	3651	G7	6601	B21		
2684	E12	3652	I7	6602	C21		
2685	F12	3655	L7	6641	B18		
2686	I12	3656	N7	6642	D18		
2687	K12	3657	M7	6643	G18		
2688	O12	3658	N7	6644	I18		
2689	A13	3659	A12	6645	L18		
2690	E13	3660	E12	6646	N18		
2691	F13	3661	A13	6647	G22		
2692	I13	3662	E13	6648	I22		
2693	K13	3663	F12	6649	C25		

1252	A1	1258	E4	2257	J5	2269	I4	2276	M5	2283	E4	3257	L3	3269	E6	3291	G4	6255	J7	6261	I3	6274	D3	7252	K5	7910	G6
1253	H1	1260	B3	2259	D7	2270	I5	2277	M7	2287	K4	3258	M3	3270	E7	3292	H7	6256	J7	6262	I3	6275	D2	7253	M3	9251	B2
1254	L1	1261	C3	2260	C7	2271	I7	2278	M2	2290	H5	3261	K5	3271	E8	3293	H6	6257	H3	6263	I4	6276	E7	7254	L6	9252	C2
1255	F1	1265	G9	2266	H3	2273	K4	2279	K5	2295	H6	3262	K6	3273	K6	3294	H6	6258	H3	6264	J7	6280	E6	7257	D5	9260	E4
1256	D2	2251	B3	2267	J6	2274	J7	2281	H5	3254	J3	3266	E7	3274	K7	3295	I7	6259	H4	6267	L6	6281	F6	7258	D6		
1257	K9	2254	C5	2268	I4	2275	K4	2282	H7	3256	M3	3268	E5	3275	L7	6251	B4	6260	H6	6268	K2	7251	J5	7908	H6		

MONOBOARD SUPPLY FR965


1252
To 1074 Mains trafo
9251
9252
1260 6,3A
1261 6,3A
1256 1A
2251 100n
6251 D5SBA20
2254 100n
60V~
+VL +40V [0V]
2260 4700µ
-VL -40V [0V]
2259 4700µ
6275 1N4003GP
6274 1N4003GP
7257 BC327-25
7258 BC327-25
-35V
3268 3k3
3269 3k3
1258 T1A6
9260
2283 220µ
-30V CIRCUIT
6276 BZX79/C5V6
6280 BZX79/C10
6281 BZX79/C22
3266 22k
3270 47E
3271 47E
-30 -32V [0V]
1255
f1
f2
amp prot
To 1072 Mains trafo
4.6V~
26V
amp prot
3291 10E
7910 BD242BFP
-12 -13,5V [0V]
2281 100n
3293 10k
3294 10k
2290 10µ
2295 10n
3292 15k
2282 470n
7908 BC857B
6260 L7812GP
3295 15k
REF
1253
To 1071 Mains trafo
6257 1N4003GP
6261 1N4003GP
2266 100n
6258 6259 6262 6263 4x 1N4003GP
+24
2268 100n
2269 2200µ
2270 100n
+12 +12V [0V]
2271 470n
3254 0E33
6255 1N4148
6256 1N4148
+5 +5V
+6 +6,8V [0V]
7251 BD242BFP
2257 10n
2267 47µ
6264 BZX79/C5V6
2274 470n
3262 10k
3261 390E
7252 BC847B
3273 270E
3274 270E
7254 BC847B
2279 100n
3275 150E
2287 3300µ
2273 100n
2275 1000µ
3257 0E33
6268 1N4003GP
1254
Relay +3.6V
MFD
To 1057 Mains part
3258 82k
3256 10k
+5D
2278 2µ2
7253 BC847B
POWER DOWN CIRCUIT
6267 L7805
2276 100n
2277 470n
+5D +5V [5V]
1265
To 1902 Surround amplifier
+VL +40V [0V]
-VL -40V [0V]
REF
DIG
1257
To 1426 Front Part
f1
f2
-30 -32V [0V]
+5D +5V [5V]
+5 +5V [0V]
amp pd
amp stdby
To Left & Right & Center Amplifier

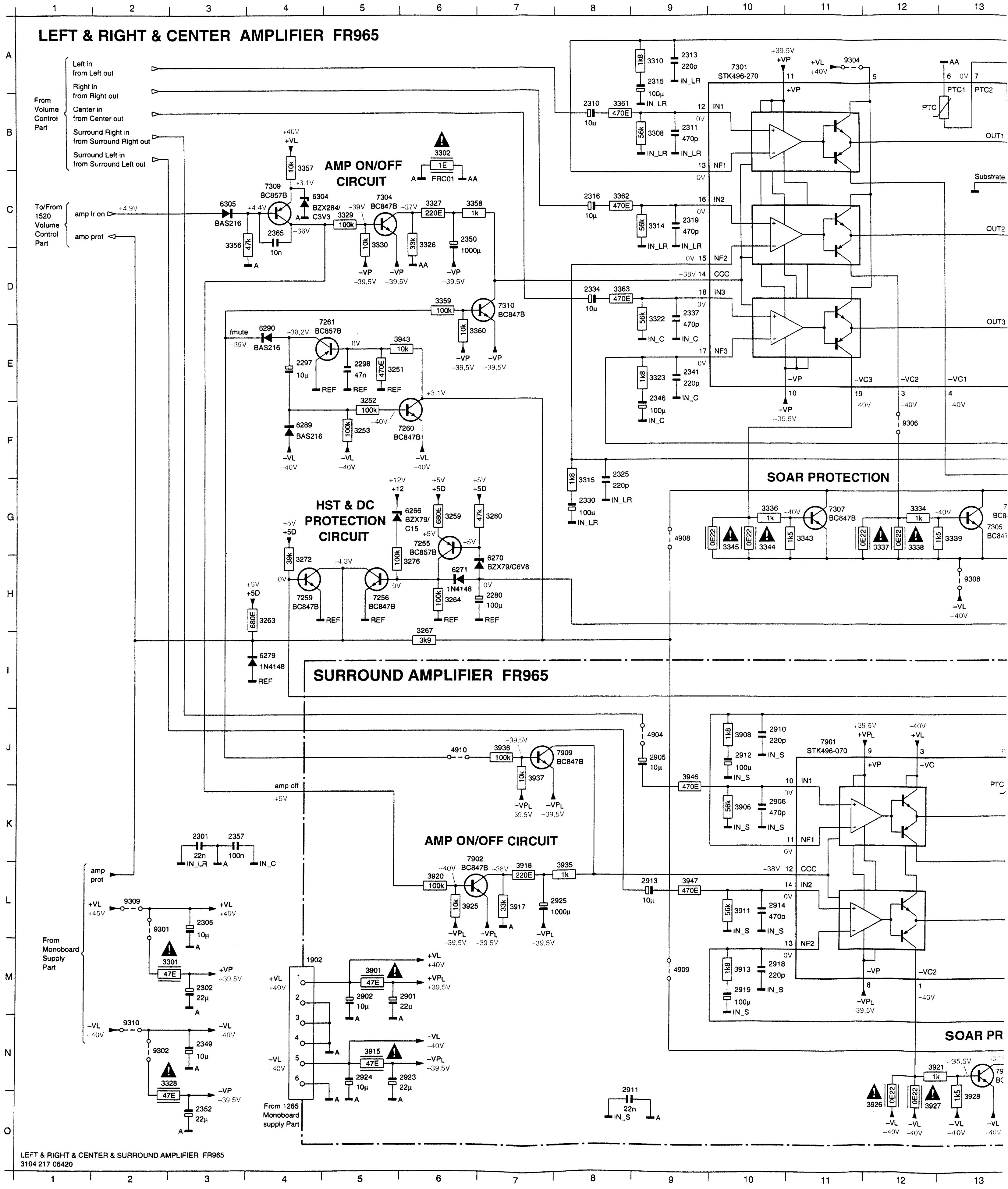
V - Voltage measured during normal operation
- Source position Tuner FM
- No special features ON

[V] Stand by

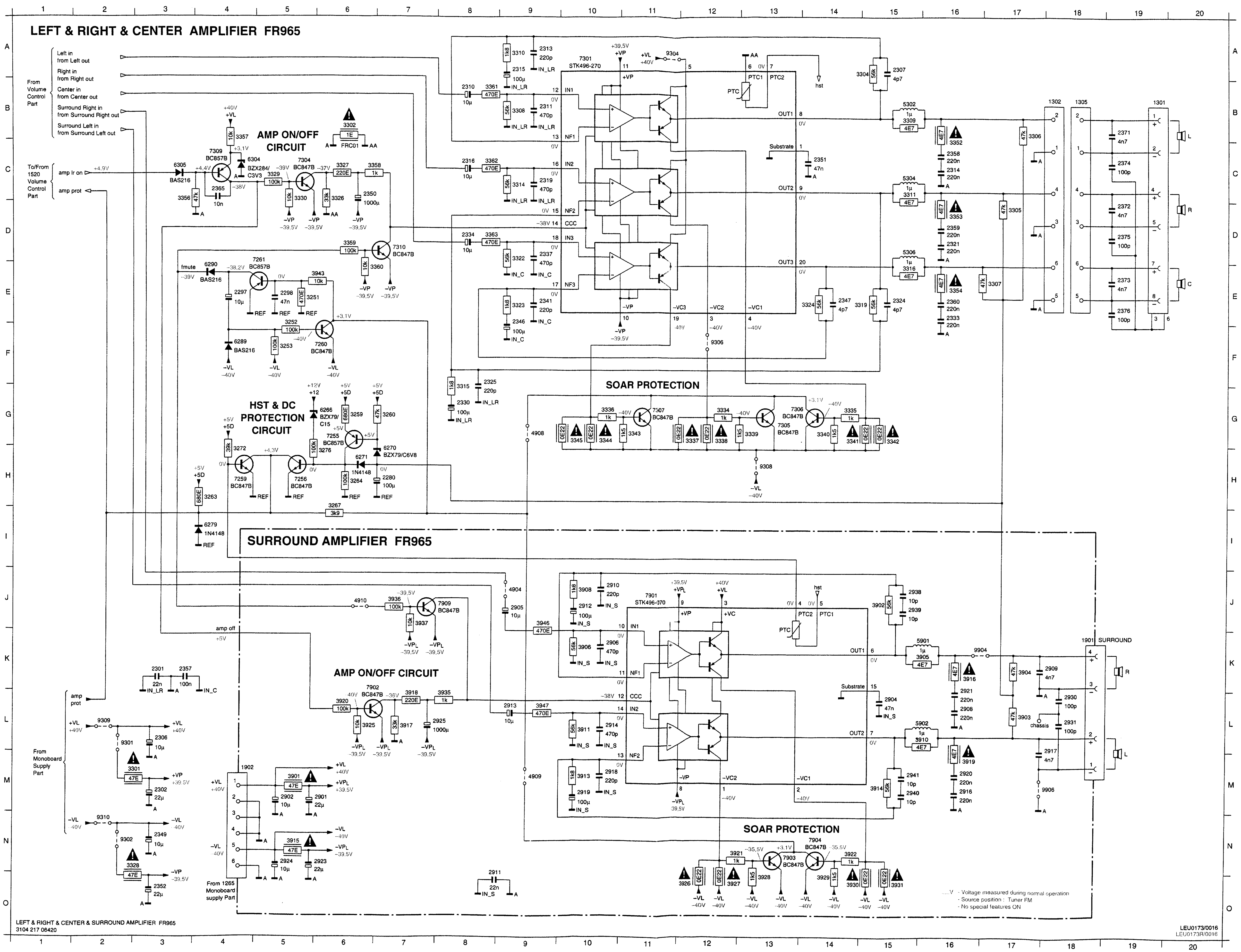
LEU0183/0016
LEU0183R/0016

Monoboard Supply FR965
3104 217 06420

LEFT & RIGHT & CENTER AMPLIFIER FR965


From Volume Control Part
Left in from Left out
Right in from Right out
Center in from Center out
Surround Right in from Surround Right out
Surround Left in from Surround Left out
To/From 1520 Volume Control Part
amp lr on
amp prot
AMP ON/OFF CIRCUIT
3302 1E FRC01
7309 BC857B
3357 10k
6305 BAS216
6304 BZX284/C3V3
7304 BC847B
3327 220E
3358 1k
2350 1000µ
3359 100k
7310 BC847B
3360 10k
7301 STK496-270
3310 1k8
2313 220p
2315 100µ
3361 470E
3308 56k
2311 470p
3362 470E
3314 56k
2319 470p
3363 470E
3322 56k
2337 470p
3323 1k8
2341 220p
2346 100µ
IN1 NF1 IN2 NF2 CCC IN3 NF3
OUT1 OUT2 OUT3
PTC1 PTC2
Substrate
fmute
6290 BAS216
7261 BC857B
3943 10k
3251 470E
3252 100k
7260 BC847B
6289 BAS216
3253 100k
HST & DC PROTECTION CIRCUIT
6266 BZX79/C15
3259 680E
3260 47k
7255 BC857B
6270 BZX79/C6V8
6271 1N4148
3264 100k
2280 100µ
3272 39k
7259 BC847B
7256 BC847B
3276 100k
3263 680E
6279 1N4148
3267 3k9
SOAR PROTECTION
3336 1k
7307 BC847B
3334 1k
3345 0E22
3344 0E22
3343 1k5
3337 0E22
3338 0E22
3339 1k5
3315 1k8
2325 220p
2330 100µ
4908
9306
9308
SURROUND AMPLIFIER FR965
4910
3936 100k
7909 BC847B
3937 10k
4904
2905 10µ
7901 STK496-070
3908 1k8
2910 220p
2912 100µ
3946 470E
3906 56k
2906 470p
AMP ON/OFF CIRCUIT
7902 BC847B
3920 100k
3918 220E
3935 1k
3925 10k
3917 33k
2925 1000µ
2913 10µ
3947 470E
3911 56k
2914 470p
3913 1k8
2918 220p
2919 100µ
4909
amp off
From Monoboard Supply Part
amp prot
9309
9301
2306 10µ
3301 47E
2302 22µ
9310
9302
2349 10µ
3328 47E
2352 22µ
2301 22n
2357 100n
1902
From 1265 Monoboard supply Part
3901 47E
2902 10µ
2901 22µ
3915 47E
2924 10µ
2923 22µ
2911 22n
SOAR PR
3921 1k
3926 0E22
3927 0E22
3928 1k5

LEFT & RIGHT & CENTER & SURROUND AMPLIFIER FR965
3104 217 06420

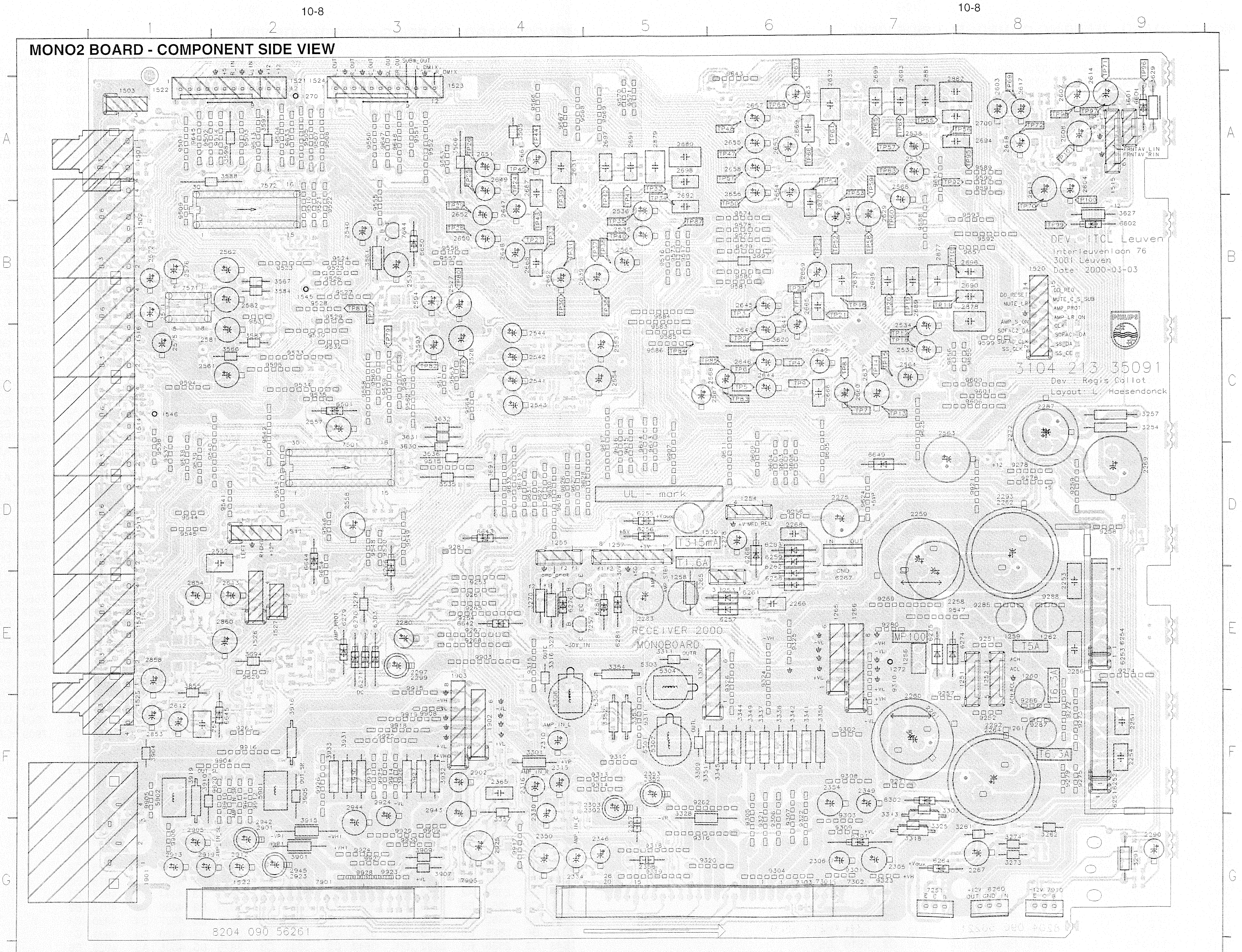

LEFT & RIGHT & CENTER AMPLIFIER FR965
SURROUND AMPLIFIER FR965
AMP ON/OFF CIRCUIT
HST & DC PROTECTION CIRCUIT
SOAR PROTECTION
AMP ON/OFF CIRCUIT
SOAR PROTECTION
From Volume Control Part
Left in from Left out
Right in from Right out
Center in from Center out
Surround Right in from Surround Right out
Surround Left in from Surround Left out
To/From 1520 Volume Control Part
amp lr on
amp prot
From Monoboard Supply Part
From 1265 Monoboard supply Part
7301 STK496-270
7901 STK496-070
IN1
IN2
IN3
NF1
NF2
NF3
CCC
OUT1
OUT2
OUT3
PTC1
PTC2
Substrate
hst
fmute
amp off
1301
1302
1305
1901 SURROUND
1902
L
R
C
chassis

.....V - Voltage measured during normal operation
- Source position : Tuner FM
- No special features ON

1301	B19	3359	D6
1302	B18	3360	E6
1305	B18	3361	B8
1901	K18	3362	C8
1902	M4	3363	D8
2280	H7	3901	M5
2297	E4	3902	J15
2298	E5	3903	L17
2301	K3	3904	K17
2302	M3	3905	K15
2306	L3	3906	K10
2307	A15	3908	J10
2310	B8	3910	L15
2311	B9	3911	L10
2313	A9	3913	M10
2314	C16	3914	M15
2315	A9	3915	N5
2316	C8	3916	K16
2319	C9	3917	L7
2321	D16	3918	L7
2324	E15	3919	M16
2325	F8	3920	L6
2330	G8	3921	N12
2333	E16	3922	N14
2334	D8	3925	L6
2337	D9	3926	O12
2341	E9	3927	O12
2346	F9	3928	O13
2347	E14	3929	O14
2349	N3	3930	O14
2350	C6	3931	O15
2351	C14	3935	L8
2352	O3	3936	J7
2357	K3	3937	J7
2358	C16	3943	E5
2359	D16	3946	J9
2360	E16	3947	L9
2365	C4	4904	J9
2371	B19	4908	G9
2372	D19	4909	M9
2373	E19	4910	J6
2374	C19	5302	B15
2375	D19	5304	C15
2376	E19	5306	D15
2901	M6	5901	K15
2902	M5	5902	L15
2904	L15	6266	G6
2905	J9	6270	H7
2906	K10	6271	H6
2908	L16	6279	I4
2909	K18	6289	F4
2910	J10	6290	E4
2911	O8	6304	C4
2912	J10	6305	C3
2913	L9	7255	G6
2914	L10	7256	H5
2916	M16	7259	H4
2917	L18	7260	F5
2918	M10	7261	E4
2919	M10	7301	A10
2920	M16	7304	C5
2921	L16	7305	G13
2923	N6	7306	G13
2924	N5	7307	G11
2925	L7	7309	C4
2930	L18	7310	D7
2931	L18	7901	J11
2938	J15	7902	L6
2939	J15	7903	N13
2940	M15	7904	N14
2941	M15	7909	J8
3251	E5	9301	L2
3252	F5	9302	N2
3253	F5	9304	A11
3259	G6	9306	F12
3260	G7	9308	H13
3263	H4	9309	L2
3264	H6	9310	N2
3267	I6	9904	K16
3272	H4	9906	M18
3276	H6		
3301	M2		
3302	B6		
3304	A14		
3305	D17		
3306	B17		
3307	E17		
3308	B9		
3309	B15		
3310	A9		
3311	C15		
3314	C9		
3315	G8		
3316	E15		
3319	E14		
3322	D9		
3323	E9		
3324	E13		
3326	D6		
3327	C6		
3328	N2		
3329	C5		
3330	D5		
3334	G12		
3335	G14		
3336	G10		
3337	G12		
3338	G12		
3339	G13		
3340	G14		
3341	G14		
3342	G15		
3343	G11		
3344	G10		
3345	G10		
3352	C16		
3353	D16		
3354	E16		
3356	D3		
3357	C4		
3358	C6		

LEFT & RIGHT & CENTER & SURROUND AMPLIFIER FR965
3104 217 08420

MONO2 BOARD - COMPONENT SIDE VIEW



10-8
10-8
1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
G
DEV. ITCL Leuven
Interleuvenlaan 76
3001 Leuven
Date 2000-03-03
3104 213 35091
Dev: Regis Collot
Layout: L. Haesendonck
PHILIPS
UL - mark
RECEIVER 2000
MONOBOARD
T315mA
T1.6A
T5A
T6.3A
T6.3A
8204 090 56261

This assembly drawing shows a summary of all versions. For components used in a specific version see shematic diagram and respective partslist.

PCS 102 466

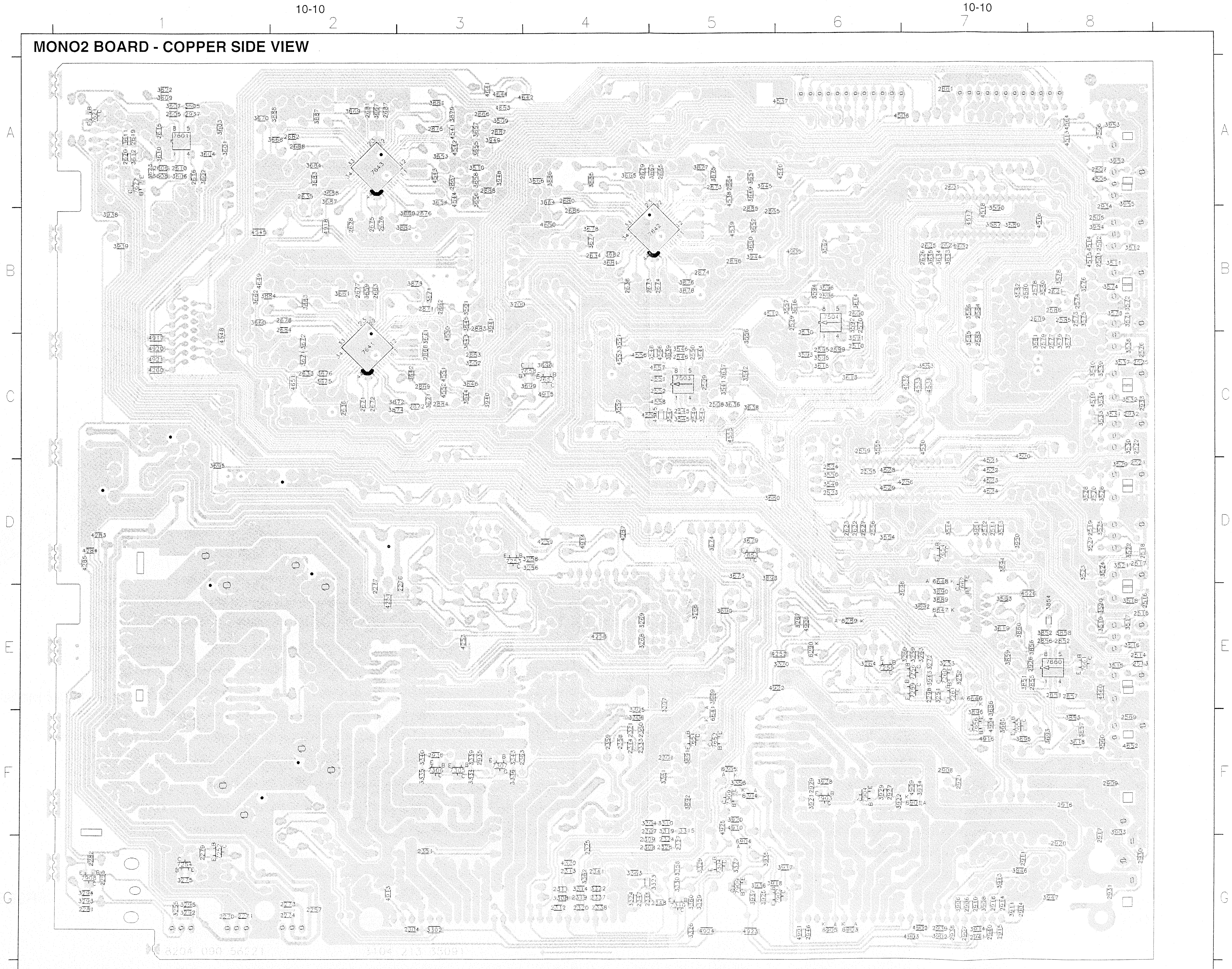
MONO2 BOARD - MAPPING COMPONENT SIDE VIEW

1251	E8	2306	G7	2643	C6	3271	E4	5306	F4	9272	F8	9536	C1	9619	D4
1252	E8	2310	F4	2644	C6	3273	G8	5901	F2	9273	F8	9537	D1	9621	D4
1253	E6	2315	F4	2645	B6	3274	G8	5902	F1	9274	E9	9538	D1	9624	D7
1254	D6	2316	F4	2646	C6	3276	E3	6251	F9	9275	F8	9539	D1	9625	C7
1255	D4	2330	F4	2647	B4	3291	G9	6252	F9	9276	D8	9540	D2	9626	D4
1256	E7	2334	G4	2648	B4	3301	F4	6253	E9	9278	D8	9541	D2	9627	D4
1257	D5	2346	G5	2649	A4	3303	F7	6254	E9	9279	F8	9542	C2	9628	D5
1258	E5	2349	F7	2650	B4	3309	F5	6255	D5	9280	E7	9543	D2	9629	E2
1259	E8	2350	G4	2651	A4	3311	E5	6256	D5	9281	D3	9544	D1	9630	D4
1260	F8	2352	F5	2652	B4	3313	G7	6257	E6	9285	E8	9545	D1	9631	D4
1261	F8	2353	F5	2653	A6	3316	E4	6258	E6	9286	F8	9546	D2	9632	D4
1262	E8	2354	F6	2654	A6	3318	G7	6259	D6	9287	F8	9547	E7	9633	A2
1265	E7	2356	G5	2655	A6	3325	G7	6260	G8	9288	E8	9548	D3	9643	A6
1266	E7	2357	G5	2656	A6	3328	G5	6261	E6	9301	G7	9549	D3	9645	A1
1270	A2	2365	F4	2657	A6	3337	F6	6262	E6	9302	F7	9550	A3	9647	A3
1272	E7	2527	B3	2658	A6	3338	F6	6263	D6	9303	G7	9551	A3	9648	A3
1302	E6	2528	C3	2659	B6	3341	F6	6264	G7	9304	G6	9552	A3	9651	A7
1501	A1	2531	F1	2660	C7	3342	F6	6266	D3	9305	G6	9553	A3	9654	D2
1502	B1	2532	D2	2661	A4	3344	F6	6267	D7	9306	G6	9555	B3	9655	C8
1503	A1	2533	C7	2662	B4	3345	F6	6268	D6	9307	G6	9556	B3	9656	C7
1511	D2	2534	C7	2663	A6	3349	F6	6270	E3	9308	F7	9557	B3	9657	B8
1512	E1	2535	B5	2664	B7	3350	F6	6271	E3	9309	G7	9558	C3	9903	E4
1513	D1	2536	B5	2665	B6	3351	F6	6274	E7	9310	E7	9559	C3	9904	F2
1514	C1	2537	A7	2666	C6	3352	F5	6275	E7	9311	F5	9560	C3	9905	F1
1515	A9	2538	A7	2667	A4	3353	F5	6276	E4	9312	F5	9561	C3	9906	G1
1516	C1	2539	B3	2668	B4	3354	E5	6279	E3	9313	F5	9562	C3	9907	D5
1520	B8	2540	B3	2669	A6	3357	F4	6280	E5	9314	F5	9563	C3	9908	F3
1521	A2	2541	C4	2670	B6	3505	A4	6281	E5	9315	E4	9564	C4	9909	G3
1522	A2	2542	C4	2689	B7	3506	A3	6301	G7	9316	G5	9566	A4	9910	F2
1523	A3	2543	C4	2690	B8	3535	D3	6302	F7	9318	G5	9567	A4	9911	F2
1524	A3	2544	C4	2691	A5	3536	D3	6303	E3	9319	G5	9568	A4	9912	F2
1525	F1	2553	C5	2692	B5	3561	B3	6501	C2	9320	G6	9569	A5	9913	F3
1526	E2	2554	C5	2693	A7	3566	C2	6601	A9	9321	G6	9570	A5	9914	F3
1527	E2	2557	C3	2694	A7	3567	B2	6602	B9	9322	G6	9571	A5	9915	E3
1530	D5	2558	D3	2695	B7	3583	C2	6642	E4	9323	G7	9573	B5	9916	F2
1545	B2	2561	C2	2696	B8	3584	B2	6643	D4	9324	E6	9574	B6	9917	G4
1546	C1	2562	B2	2697	A5	3588	A1	6644	D2	9325	E6	9577	B6	9918	F3
1601	A9	2563	D7	2698	A5	3597	A2	6645	F2	9326	E6	9578	B6	9919	F3
1901	G1	2564	C7	2699	A7	3598	A2	6649	D7	9501	A1	9579	B6	9920	F2
1902	F4	2565	B5	2700	A7	3620	C6	6650	B3	9502	A1	9580	B6	9921	D8
1903	F3	2566	B7	2853	F1	3627	B9	7251	G7	9503	A2	9581	B6	9922	F3
2251	F9	2567	C5	2854	E1	3629	A9	7257	E4	9504	A2	9583	C5	9923	G3
2253	E8	2568	C6	2858	E1	3630	D3	7258	E4	9505	A2	9584	B5	9924	G3
2254	F9	2571	B1	2860	E2	3631	C3	7301	G5	9507	A2	9585	C5	9925	F3
2256	E8	2572	B1	2877	B7	3632	C3	7302	G6	9508	A2	9586	C5	9926	F2
2258	E7	2575	C1	2878	C8	3691	D4	7303	G5	9509	B1	9588	B7	9927	G3
2259	D7	2576	B1	2879	A5	3694	E2	7501	D3	9510	B2	9589	A8	9928	G3
2260	F7	2581	C2	2880	A5	3697	B6	7571	B1	9511	C3	9590	A8	9929	G3
2261	F7	2582	B2	2881	A7	3855	E1	7572	B2	9513	A2	9591	A8	9930	G3
2262	D8	2593	C3	2882	A7	3901	G2	7644	B3	9514	A2	9592	B8		
2264	F8	2594	B3	2901	G2	3904	F1	7901	G2	9515	D3	9593	B8		
2266	E6	2603	A8	2902	F3	3905	F2	7905	G3	9516	B5	9594	C1		
2267	G8	2604	A8	2905	G1	3907	G3	7910	G8	9517	B5	9595	C2		
2268	D6	2607	A8	2912	G2	3909	G3	9251	E8	9520	D3	9599	C8		
2269	D9	2608	A8	2913	G1	3910	F1	9252	F8	9521	B2	9600	C8		
2272	C8	2611	A8	2919	G1	3915	G2	9253	E4	9522	B2	9601	C8		
2275	D7	2612	F1	2923	G2	3916	F2	9254	E4	9523	B2	9603	D6		
2278	D6	2613	E2	2924	F3	3919	F1	9256	D6	9524	B3	9604	D6		
2280	E3	2614	A9	2925	G4	3926	F3	9257	F7	9525	B2	9605	D6		
2283	E5	2617	A8	2942	G2	3927	F3	9258	D9	9526	B2	9606	C8		
2287	C8	2618	A8	2943	F3	3930	F3	9259	D8	9527	B3	9608	D6		
2290	G9	2629	B7	2944	G3	3931	F3	9261	E4	9528	B2	9609	D6		
2292	F8	2630	B7	2945	G2	3932	F3	9262	F5	9529	B2	9611	D6		
2293	D8	2631	A4	3254	C9	3933	F2	9263	F2	9530	C2	9613	C5		
2297	E3	2632	A6	3257	C9	5301	F5	9265	E4	9531	B2	9614	C5		
2299	E3	2637	C7	3261	G8	5302	F5	9267	E4	9532	C2	9615	D5		
2302	F5	2639	B5	3262	G8	5303	E5	9268	E4	9533	C2	9616	D5		
2303	F5	2641	C6	3265	E5	5304	E5	9269	E7	9534	C2	9617	C5		
2305	G7	2642	C6	3270	E4	5305	F4	9271	F7	9535	C2	9618	D4		

MONO2 BOARD - MAPPING COPPER SIDE VIEW

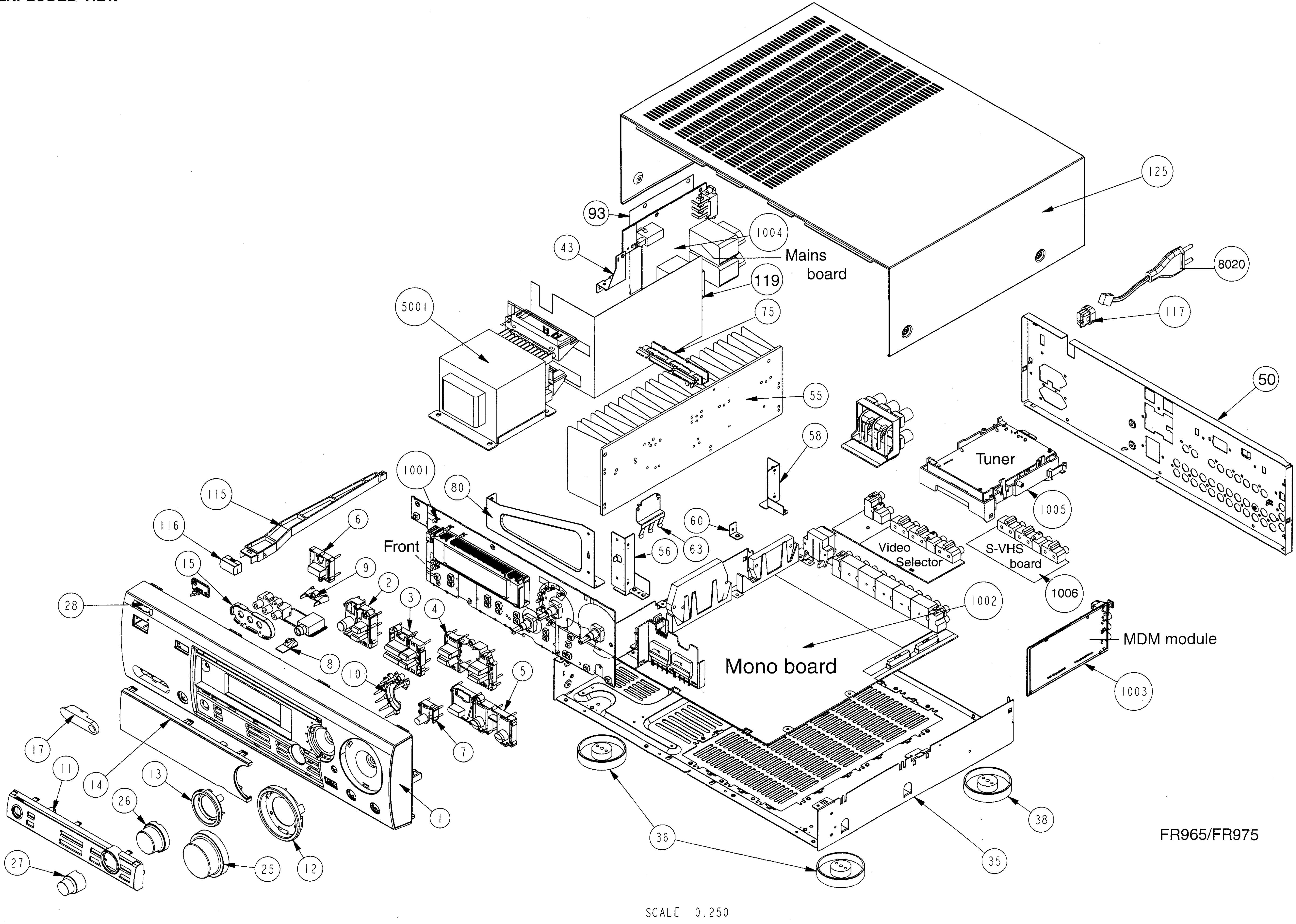
2257	G2	2550	C5	2862	B3	3295	G1	3546	C5	3644	C3	3879	A3	4513	A8	4925	F5
2270	G1	2551	C5	2863	C3	3302	G3	3547	C5	3645	B3	3880	B3	4514	B8	6289	E6
2271	G1	2552	C5	2864	A5	3304	F5	3548	C5	3646	C3	3881	A3	4515	B8	6290	E6
2273	G2	2555	D6	2865	B5	3305	F4	3549	D6	3649	A5	3882	B3	4516	B8	6304	F5
2274	G2	2556	D6	2866	A3	3306	F4	3550	D6	3650	B5	3883	B2	4517	B7	6305	F5
2276	E3	2559	C6	2867	A3	3307	E5	3551	C4	3651	A5	3884	B1	4518	B7	6641	F5
2277	E2	2569	F8	2868	C3	3308	G4	3552	C4	3652	B5	3885	A4	4519	C8	6646	E7
2279	G1	2570	B6	2869	C3	3310	F5	3553	C7	3653	A3	3886	A4	4520	C7	6647	E7
2281	G1	2573	B8	2871	B3	3314	G4	3554	D6	3654	A3	3887	A2	4521	D7	6648	D7
2282	G1	2574	B8	2872	C3	3315	F5	3555	C6	3655	A3	3888	A2	4522	D7	6901	F7
2295	G1	2577	C8	2873	A5	3319	F5	3556	C5	3656	A3	3889	E7	4523	D7	6903	G6
2298	E7	2578	B8	2874	B5	3320	E6	3557	B6	3657	A3	3890	E7	4524	D7	6904	G5
2301	F5	2579	C8	2875	A3	3322	G4	3560	F8	3658	A3	3891	F5	4526	E7	6905	G6
2304	G3	2580	B7	2876	B3	3323	G4	3562	B6	3659	B2	3892	F5	4528	D6	7252	G1
2307	F5	2583	C7	2883	B3	3324	G4	3563	E7	3660	B1	3893	D5	4529	D6	7253	D3
2308	G5	2584	B7	2884	C3	3326	G5	3571	B8	3661	B2	3894	D7	4530	C7	7254	G1
2309	G5	2585	B8	2885	B5	3327	G5	3572	B8	3662	B1	3895	F7	4531	C7	7255	E6
2311	G4	2586	B8	2886	B5	3329	G5	3573	B8	3663	A5	3896	F7	4532	C7	7256	E7
2312	G4	2595	C6	2887	A3	3330	G5	3574	B8	3664	A4	3902	G7	4533	C7	7259	E7
2313	G4	2596	B6	2888	A3	3334	F3	3575	B8	3665	A4	3903	F8	4537	A6	7260	E7
2314	F4	2599	C6	2904	G7	3335	F3	3576	B8	3666	A4	3906	G7	4538	A5	7261	E7
2319	G4	2600	B6	2906	G7	3336	F3	3577	C8	3667	A2	3908	G7	4539	B5	7304	G5
2320	G4	2601	A7	2907	G7	3339	F3	3578	B8	3668	A2	3911	G7	4540	A6	7305	F3
2321	F4	2602	B7	2908	F7	3340	F3	3579	C8	3669	A2	3913	G7	4541	A3	7306	F3
2324	G5	2605	A1	2909	F8	3343	F3	3580	B8	3670	A1	3914	G7	4542	A3	7307	F3
2325	G4	2606	A1	2910	G7	3356	F5	3581	C8	3671	C2	3917	G6	4543	A3	7309	F5
2326	G5	2609	B8	2911	G7	3358	G5	3582	B7	3672	C2	3918	G6	4544	A3	7310	G5
2327	G5	2610	A1	2914	G7	3359	G5	3585	C7	3673	D5	3920	F5	4545	B1	7503	C5
2333	F4	2615	A1	2915	G7	3360	G5	3586	B7	3674	D5	3921	F6	4548	C1	7504	B6
2337	G4	2616	A1	2916	F8	3361	F5	3587	B7	3675	C2	3922	F6	4550	C3	7601	A1
2338	G4	2619	A1	2917	G8	3362	G4	3589	B7	3676	C2	3925	G5	4551	C3	7621	A1
2341	G4	2620	A1	2918	G7	3363	G4	3590	B7	3677	B4	3928	F6	4552	C3	7622	A1
2345	G4	2621	B8	2920	G8	3501	B3	3591	C6	3678	B4	3929	F6	4553	C4	7641	C2
2347	G4	2622	D6	2921	F7	3502	C3	3592	B6	3679	D5	3934	F7	4555	C5	7642	B5
2348	G5	2623	D6	2926	E8	3509	A3	3593	C6	3680	D5	3935	G5	4556	C4	7643	A2
2351	G3	2624	B7	2927	F6	3510	A3	3594	B6	3681	B4	3936	G5	4557	C5	7651	F5
2358	F4	2625	B7	2929	F6	3511	B8	3595	C6	3682	B4	3937	G5	4558	C5	7652	F5
2359	F4	2626	B7	2930	G8	3512	B8	3596	B6	3683	A2	3938	B1	4559	C4	7653	D5
2360	F4	2627	D6	2931	G8	3513	D7	3601	A1	3684	A2	3939	B1	4560	E8	7654	D7
2363	F3	2628	B2	2932	C8	3514	D7	3602	A1	3685	F7	3940	C3	4564	A8	7655	F7
2501	B8	2633	C2	2933	C8	3515	E8	3603	A1	3686	E7	3941	B3	4565	C5	7656	F7
2502	B8	2634	B4	2934	B8	3516	E8	3604	A1	3687	A2	3943	E7	4566	C5	7657	C4
2505	B8	2635	A2	2935	F3	3517	E8	3605	A1	3688	A2	3944	B5	4641	A3	7658	C4
2506	A8	2636	C2	2936	F3	3518	E8	3606	A1	3689	E5	3945	A5	4642	A4	7660	E8
2507	A8	2638	B4	2937	A1	3519	E8	3607	A1	3690	E5	3946	G7	4644	A3	7661	E8
2508	C5	2671	C2	2938	G7	3520	E8	3608	A1	3692	E7	3947	G8	4649	B1	7662	E7
2509	C5	2672	C2	2939	G7	3521	D8	3609	A1	3693	F8	3948	A3	4650	B4	7902	G6
2510	C6	2673	B4	2940	G7	3522	D8	3610	A1	3695	D1	3949	A3	4651	C2	7903	F6
2511	D7	2674	B5	2941	G7	3523	D8	3611	A1	3696	C4	3950	D7	4652	F8	7904	F6
2512	D7	2675	B2	2946	G6	3524	D8	3612	A1	3698	E6	3951	D7	4653	A3	7908	G1
2513	E8	2676	B2	3251	E7	3525	D8	3613	C6	3699	C4	3952	A8	4901	G6	7909	G5
2514	E8	2677	B2	3252	E7	3526	D8	3614	B6	3700	B3	3953	A8	4902	G7		
2515	E8	2678	B2	3253	E7	3527	D8	3615	C6	3851	E7	3954	B8	4903	G7		
2516	E8	2679	A4	3255	G1	3528	D8	3616	B6	3852	E8	3955	A8	4904	F7		
2517	D8	2680	A4	3256	D4	3529	D8	3618	F8	3853	F8	4251	E2	4905	B6		
2518	D8	2681	A2	3258	D4	3530	C8	3619	E7	3854	E8	4252	E6	4908	E6		
2519	D8	2682	A2	3259	E7	3531	C8	3621	C3	3856	E8	4253	E3	4909	F7		
2520	D8	2683	B2	3260	E7	3532	C8	3622	A1	3857	F8	4256	D7	4910	F5		
2521	D8	2684	B2	3263	E7	3533	C8	3623	A1	3858	E8	4258	E4	4913	G2		
2522	C8	2685	A5	3264	E6	3534	C8	3633	B7	3859	E7	4259	D4	4914	D4		
2523	D6	2686	B4	3266	E5	3537	C8	3634	B7	3860	E7	4260	C1	4915	C4		
2524	D6	2687	A2	3267	E6	3538	C8	3635	B7	3871	B3	4283	D1	4916	F7		
2525	C8	2688	A2	3268	E4	3539	C8	3636	C5	3872	C3	4284	D1	4917	C1		
2526	C8	2851	E8	3269	E4	3540	C8	3637	C5	3873	B3	4285	D1	4918	B2		
2529	B6	2852	E8	3272	E7	3541	C5	3638	C5	3874	C3	4287	D4	4920	C1		
2530	B6	2855	E8	3275	G1	3542	C5	3639	C5	3875	A5	4320	G4	4921	C1		
2545	C5	2856	E8	3292	G1	3543	C5	3641	C3	3876	B5	4505	A8	4922	E6		
2546	C5	2857	E8	3293	G1	3544	C5	3642	C3	3877	A5	4506	A6	4923	G5		
2549	C5	2861	A7	3294	G1	3545	C5	3643	C3	3878	B5	4512	B5	4924	G5		

MONO2 BOARD - COPPER SIDE VIEW


10-10
10-10
1
2
3
4
5
6
7
8
A
B
C
D
E
F
G
8204 000 56221
3104 213 33091

This assembly drawing shows a summary of all versions. For components used in a specific version see shematic diagram and respective partslist.

EXPLODED VIEW


125
93
1004
Mains
board
43
119
5001
75
8020
117
50
55
58
Tuner
1005
1001
80
115
116
6
60
63
56
Front
Video
Selector
S-VHS
board
1006
15
9
28
2
3
4
1002
MDM module
Mono board
8
10
5
1003
17
7
11
14
13
1
26
36
38
35
27
25
12
FR965/FR975

SCALE 0.250

PARTSLIST - EXPLODED VIEW

MECHANICAL PARTS FR965/00

1	3104 217 52930	FRONT ASSY
2	4822 410 12442	BUTTON HINGE ASSY SURR.
3	4822 410 12435	BUTTONS HINGE TUNER
4	4822 410 12443	BUTTON HINGE ASSY MENU
5	4822 410 12436	BUTTONS HINGE BASS TREBLE
6	4822 410 12437	BUTTONS EASY LINK
8	4822 380 10274	LIGHT GUIDE SURROUND
9	3104 214 38460	LIGHT GUIDE VIRTUAL/HALL
10	4822 380 10277	LIGHT GUIDE SELECTOR
11	3104 217 52760	ORNAMENTAL PLATE ASSY
12	3104 217 52130	RING KNOB VOLUME
13	3104 217 52140	RING KNOB SOURCE SEL.
14	3104 217 52910	WINDOW DISPLAY ASSY
25	4822 410 12438	KNOB VOLUME
26	4822 410 12439	KNOB SOURCE SELECTOR
27	4822 410 12441	KNOB MENU NAV
28	4822 459 10887	BADGE PHILIPS
36	4822 691 10773	LEG SILVER
38	4822 691 10773	LEG SILVER
115	4822 535 10638	POWER ROD
116	4822 462 11176	POWER CAP
117	4822 532 60948	BUSCH
125	4822 442 01817	COVERPLATE

MECHANICAL PARTS FR966/00S

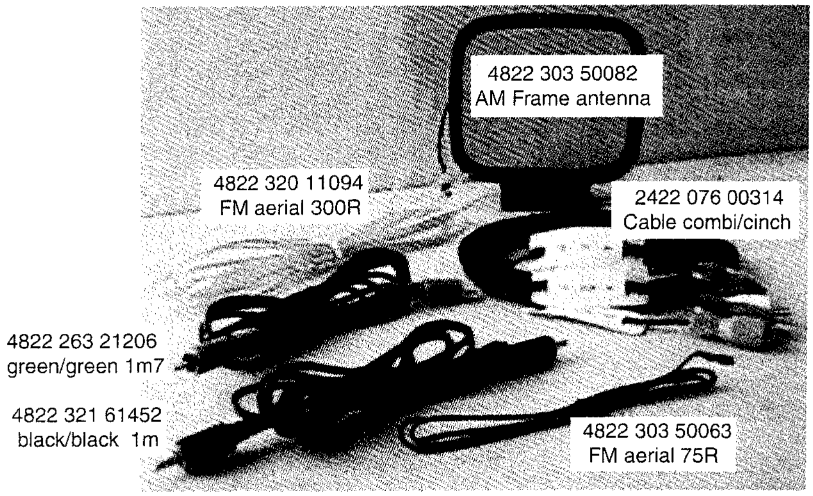
1	3104 217 53030	FRONT ASSY
2	3104 217 53130	BUTTON HINGE SURR.
3	3104 217 53140	BUTTON HINGE TUNER
4	3104 217 53120	BUTTON HINGE MENU
5	3104 217 53150	BUTTON HINGE BASS TREBLE
6	3104 217 53110	BUTTON HINGE EASY LINK
8	4822 380 10274	LIGHT GUIDE SURROUND
9	3104 214 38460	LIGHT GUIDE VIRTUAL/HALL
10	4822 380 10277	LIGHT GUIDE SELECTOR
11	3104 217 53040	ORNAMENTAL PLATE
12	3104 217 53080	RING KNOB VOLUME
13	3104 217 53090	RING KNOB SOURCE SEL.
14	3104 217 52910	WINDOW DISPLAY ASSY
25	3104 217 53050	KNOB VOLUME
26	3104 217 53060	KNOB SOURCE SELECTOR
27	3104 217 53070	KNOB MENU NAV
28	4822 459 10887	BADGE PHILIPS
36	4822 691 10773	LEG SILVER
38	4822 691 10773	LEG SILVER
115	4822 535 10638	POWER ROD
116	3104 217 53100	POWER CAP
117	4822 532 60948	BUSCH
125	3104 211 29730	COVERPLATE

ELECTRICAL PARTS

1003	3104 217 06780	MDM 2000 V2
5001 ⚠	3104 218 30980	MAINS TRAFO
8020 ⚠	4822 321 11139	POWER CORD

MISCELLANEOUS PARTS

4822 303 50063	FM AERIAL 75R
2422 076 00314	CABLE COMB/CINCH
4822 303 50082	AM FRAME
3104 219 04310	IRT PROD. ASSY
4822 321 61452	CABLE ASSY CINCH/CINCH
3103 306 17010	INSTR.FOR USE



note: Only the parts mentioned in this list are normal service parts

ELECTRICAL PARTSLIST - MONO2 BOARD

MISCELLANEOUS

1256	▲	4822 252 51173	FUSE 1A
1258	▲	4822 071 51602	FUSE 1.6A
1260	▲	4822 252 51123	FUSE 6,3A
1261	▲	4822 252 51123	FUSE 6,3A
1301	▲	2422 015 19403	CONN. SCREW
1502		4822 267 31823	CONN. CINCH
1512		4822 267 31823	CONN. CINCH
1513		4822 267 31823	CONN. CINCH
1514		4822 267 31823	CONN. CINCH
1516		4822 267 31823	CONN. CINCH
1520		4822 265 10981	CINCH 1P
1521		2422 025 11067	CONN. BM V 12P
1523		2422 025 11067	CONN. BM V 12P
1525		4822 265 11608	CONN. CINCH
1540		4822 265 20542	CONN. CINCH
1542		2422 026 05134	CONN. CINCH
1550		4822 267 31729	CINCH 1P
1801		4822 267 31996	CONN. 1P
1802		4822 265 11619	CINCH 2P
1803		4822 265 11619	CINCH 2P
1901		4822 265 11609	CONN. CLICK 4P

CAPACITORS

2251	5322 121 42578	100NF 5%	250V
2254	5322 121 42578	100NF 5%	250V
2257	4822 122 33177	10NF 20%	50V
2259	4822 124 80415	4700UF20%	50V
2260	4822 124 80415	4700UF20%	50V
2266	5322 121 42386	100NF 5%	63V
2267	4822 124 41751	47UF 20%	50V
2268	5322 121 42386	100NF 5%	63V
2269	4822 124 11583	2200UF 20%	35V
2270	4822 126 13838	100NF	50V P80M20
2271	4822 126 14583	470NF 10%	16V
2272	4822 124 12328	6800UF	16V
2273	4822 126 14585	100NF 10%	50V
2274	4822 126 14583	470NF 10%	16V
2275	4822 124 81144	1000U	16V
2276	4822 126 14585	100NF 10%	50V
2277	4822 126 14583	470NF 10%	16V
2278	4822 124 22652	2,2UF20%	50V
2279	4822 126 14585	100NF 10%	50V
2280	4822 124 41584	100UF 20%	10V
2281	4822 126 13838	100NF	50V P80M20
2282	4822 126 14583	470NF 10%	16V
2283	4822 124 11769	220UF 20%	50V
2290	4822 124 40248	10UF20%	63V
2295	4822 122 33177	10NF 20%	50V
2297	4822 124 40248	10UF20%	63V
2298	4822 126 13751	47NF10% X7R	63V
2301	5322 122 32654	22NF10%X7R	63V
2302	4822 124 81151	22UF	50V
2306	4822 124 40248	10UF20%	63V
2307	5322 122 32287	4,7PF 5%NP0	50V
2310	4822 124 40248	10UF20%	63V
2311	5322 122 32268	470PF 10%	50V
2313	4822 122 33575	220PF 5% NP0	63V
2314	4822 126 13473	220NF80-20%	50V

CAPACITORS

2315	4822 124 41584	100UF 20%	10V
2316	4822 124 40248	10UF20%	63V
2319	5322 122 32268	470PF 10%	50V
2321	4822 126 13473	220NF80-20%	50V
2324	5322 122 32287	4,7PF 5%NP0	50V
2325	4822 122 33575	220PF 5% NP0	63V
2330	4822 124 41584	100UF 20%	10V
2333	4822 126 13473	220NF80-20%	50V
2334	4822 124 40248	10UF20%	63V
2337	5322 122 32268	470PF 10%	50V
2341	4822 122 33575	220PF 5% NP0	63V
2346	4822 124 41584	100UF 20%	10V
2347	5322 122 32287	4,7PF 5%NP0	50V
2349	4822 124 40248	10UF20%	63V
2350	4822 124 40181	220UF20%	10V
2351	4822 126 13751	47NF10% X7R	63V
2352	4822 124 81151	22UF	50V
2357	4822 126 12882	100NF+80-20%	50V
2358	4822 126 13473	220NF80-20%	50V
2359	4822 126 13473	220NF80-20%	50V
2360	4822 126 13473	220NF80-20%	50V
2365	4822 121 41857	10NF 5%	250V
2371	5322 126 10223	4,7NF10%X7R	63V
2372	5322 126 10223	4,7NF10%X7R	63V
2373	5322 126 10223	4,7NF10%X7R	63V
2374	5322 122 32531	100PF 5%NP0	50V
2375	5322 122 32531	100PF 5%NP0	50V
2376	5322 122 32531	100PF 5%NP0	50V
2501	5322 126 10511	1NF 5%NP0	50V
2502	5322 126 10511	1NF 5%NP0	50V
2505	5322 126 10511	1NF 5%NP0	50V
2506	5322 126 10511	1NF 5%NP0	50V
2507	5322 126 10511	1NF 5%NP0	50V
2508	5322 122 32531	100PF 5%NP0	50V
2509	5322 122 32531	100PF 5%NP0	50V
2510	5322 122 32531	100PF 5%NP0	50V
2511	5322 122 32531	100PF 5%NP0	50V
2512	5322 122 32531	100PF 5%NP0	50V
2513	5322 122 32531	100PF 5%NP0	50V
2514	5322 122 32531	100PF 5%NP0	50V
2515	5322 122 32531	100PF 5%NP0	50V
2516	5322 122 32531	100PF 5%NP0	50V
2517	5322 122 32531	100PF 5%NP0	50V
2518	5322 122 32531	100PF 5%NP0	50V
2519	5322 122 32531	100PF 5%NP0	50V
2520	5322 122 32531	100PF 5%NP0	50V
2521	5322 122 32531	100PF 5%NP0	50V
2522	5322 122 32531	100PF 5%NP0	50V
2525	5322 122 32531	100PF 5%NP0	50V
2526	5322 122 32531	100PF 5%NP0	50V
2527	4822 124 41751	47UF 20%	50V
2528	4822 124 41751	47UF 20%	50V
2529	4822 126 13838	100NF	50V P80M20
2530	4822 126 13838	100NF	50V P80M20
2531	4822 121 42408	220NF 5%	63V
2532	4822 121 42408	220NF 5%	63V
2533	4822 124 81151	22UF	50V
2534	4822 124 81151	22UF	50V

ELECTRICAL PARTSLIST - MONO2 BOARD

CAPASITORS

2535	4822 124 81151	22UF 50V
2536	4822 124 81151	22UF 50V
2537	4822 124 81151	22UF 50V
2538	4822 124 81151	22UF 50V
2539	4822 124 40207	100UF20% 25V
2540	4822 124 40433	47UF20% 25V
2541	4822 124 40248	10UF20% 63V
2542	4822 124 40248	10UF20% 63V
2543	4822 124 11912	220UF 20% 6,3V
2544	4822 124 11912	220UF 20% 6,3V
2545	5322 122 32531	100PF 5%NP0 50V
2546	5322 122 32531	100PF 5%NP0 50V
2549	5322 122 32658	22PF 5% 50V
2550	5322 122 32658	22PF 5% 50V
2551	4822 126 13838	100NF 50V P80M20
2552	4822 126 13838	100NF 50V P80M20
2553	4822 124 41751	47UF 20% 50V
2554	4822 124 41751	47UF 20% 50V
2555	4822 126 13838	100NF 50V P80M20
2556	4822 126 13838	100NF 50V P80M20
2557	4822 124 41751	47UF 20% 50V
2558	4822 124 41751	47UF 20% 50V
2559	4822 126 12105	CER2 50V 33NF PM5
2561	4822 124 40764	22UF 100 V
2562	4822 124 40764	22UF 100 V
2563	4822 123 14025	16V 2200U 20%
2564	4822 124 22652	2,2UF20% 50V
2565	4822 124 22652	2,2UF20% 50V
2566	4822 124 22652	2,2UF20% 50V
2567	4822 124 40769	4,7UF20% 100V
2568	4822 124 40769	4,7UF20% 100V
2569	5322 122 32531	100PF 5%NP0 50V
2570	5322 122 32531	100PF 5%NP0 50V
2571	4822 124 40248	10UF20% 63V
2572	4822 124 40248	10UF20% 63V
2573	4822 122 33575	220PF 5% NP0 63V
2574	4822 122 33575	220PF 5% NP0 63V
2575	4822 124 40248	10UF20% 63V
2576	4822 124 40248	10UF20% 63V
2577	4822 122 33177	10NF 20% X7R 50V
2578	4822 122 33177	10NF 20% X7R 50V
2579	4822 122 33127	2,2NF10%X7R 63V
2580	4822 122 33127	2,2NF10%X7R 63V
2581	4822 124 41751	47UF 20% 50V
2582	4822 124 41751	47UF 20% 50V
2583	4822 122 33891	3,3NF10%X7R 63V
2584	4822 122 33891	3,3NF10%X7R 63V
2585	4822 126 13695	82PF 1% NP0 63V
2586	4822 126 13695	82PF 1% NP0 63V
2593	4822 124 81151	22UF 50V
2594	4822 124 81151	22UF 50V
2595	5322 122 32531	100PF 5%NP0 50V
2596	5322 122 32531	100PF 5%NP0 50V
2599	5322 122 32658	22PF 5% 50V
2600	5322 122 32658	22PF 5% 50V
2603	4822 124 81151	22UF 50V
2604	4822 124 81151	22UF 50V

CAPACITORS

2605	4822 126 13692	47PF 1% NP0 63V
2606	4822 126 13692	47PF 1% NP0 63V
2607	4822 124 41751	47UF 20% 50V
2608	4822 124 41751	47UF 20% 50V
2610	4822 122 33575	220PF 5% NP0 63V
2611	4822 124 40207	100UF20% 25V
2612	4822 124 40248	10UF20% 63V
2613	4822 124 40248	10UF20% 63V
2614	4822 124 40207	100UF20% 25V
2615	5322 122 32654	22NF10%X7R 63V
2616	5322 122 32654	22NF10%X7R 63V
2617	4822 124 40248	10UF20% 63V
2618	4822 124 40248	10UF20% 63V
2619	5322 122 32531	100PF 5%NP0 50V
2620	5322 122 32531	100PF 5%NP0 50V
2622	5322 122 32531	100PF 5%NP0 50V
2623	5322 122 32531	100PF 5%NP0 50V
2624	5322 122 32531	100PF 5%NP0 50V
2625	5322 122 32531	100PF 5%NP0 50V
2626	5322 122 32531	100PF 5%NP0 50V
2627	5322 122 32531	100PF 5%NP0 50V
2628	4822 126 14585	100NF 10% 50V
2629	4822 124 41751	47UF 20% 50V
2630	5322 121 42386	100NF 5% 63V
2631	5322 121 42386	100NF 5% 63V
2632	5322 121 42386	100NF 5% 63V
2633	5322 122 32654	22NF10%X7R 63V
2634	5322 122 32654	22NF10%X7R 63V
2635	5322 122 32654	22NF10%X7R 63V
2636	4822 126 14585	100NF 10% 50V
2637	4822 124 41751	47UF 20% 50V
2638	4822 126 14585	100NF 10% 50V
2639	4822 124 41751	47UF 20% 50V
2641	4822 124 21913	1UF20% 63V
2642	4822 124 21913	1UF20% 63V
2643	4822 124 21913	1UF20% 63V
2644	4822 124 21913	1UF20% 63V
2645	4822 124 21913	1UF20% 63V
2646	4822 124 21913	1UF20% 63V
2647	4822 124 21913	1UF20% 63V
2648	4822 124 21913	1UF20% 63V
2649	4822 124 21913	1UF20% 63V
2650	4822 124 21913	1UF20% 63V
2651	4822 124 21913	1UF20% 63V
2652	4822 124 21913	1UF20% 63V
2655	4822 124 21913	1UF20% 63V
2656	4822 124 21913	1UF20% 63V
2657	4822 124 21913	1UF20% 63V
2658	4822 124 21913	1UF20% 63V
2659	4822 124 22652	2,2UF20% 50V
2660	4822 124 22652	2,2UF20% 50V
2661	4822 124 22652	2,2UF20% 50V
2662	4822 124 22652	2,2UF20% 50V
2663	4822 124 22652	2,2UF20% 50V
2664	4822 124 22652	2,2UF20% 50V
2665	4822 121 43526	47NF 5% 250V
2666	4822 121 43526	47NF 5% 250V

ELECTRICAL PARTSLIST - MONO2 BOARD

CAPACITORS

2667	4822 121 43526	47NF 5%	250V
2668	4822 121 43526	47NF 5%	250V
2669	4822 121 43526	47NF 5%	250V
2670	4822 121 43526	47NF 5%	250V
2671	5322 122 31866	6,8NF10%X7R	63V
2672	5322 122 31866	6,8NF10%X7R	63V
2673	5322 122 31866	6,8NF10%X7R	63V
2674	5322 122 31866	6,8NF10%X7R	63V
2675	5322 122 31866	6,8NF10%X7R	63V
2676	5322 122 31866	6,8NF10%X7R	63V
2677	5322 122 32654	22NF10%X7R	63V
2678	5322 122 32654	22NF10%X7R	63V
2679	5322 122 32654	22NF10%X7R	63V
2680	5322 122 32654	22NF10%X7R	63V
2681	5322 122 32654	22NF10%X7R	63V
2682	5322 122 32654	22NF10%X7R	63V
2683	5322 122 32654	22NF10%X7R	63V
2684	5322 122 32654	22NF10%X7R	63V
2685	5322 122 32654	22NF10%X7R	63V
2686	5322 122 32654	22NF10%X7R	63V
2687	5322 122 32654	22NF10%X7R	63V
2688	5322 122 32654	22NF10%X7R	63V
2689	5322 121 42465	68NF 5%	63V
2690	5322 121 42465	68NF 5%	63V
2691	5322 121 42465	68NF 5%	63V
2692	5322 121 42465	68NF 5%	63V
2693	5322 121 42465	68NF 5%	63V
2694	5322 121 42465	68NF 5%	63V
2695	5322 121 42465	68NF 5%	63V
2696	5322 121 42465	68NF 5%	63V
2697	5322 121 42465	68NF 5%	63V
2698	5322 121 42465	68NF 5%	63V
2699	5322 121 42465	68NF 5%	63V
2700	5322 121 42465	68NF 5%	63V
2801	4822 124 22833	10UF	50V
2802	4822 124 22833	10UF	50V
2803	4822 124 22833	10UF	50V
2805	4822 126 14585	100NF 10%	50V
2806	4822 126 14585	100NF 10%	50V
2807	4822 126 14585	100NF 10%	50V
2809	5322 122 34098	10NF10%X7R	63V
2810	4822 124 40196	220UF20%	16V
2811	5322 122 34098	10NF10%X7R	63V
2812	4822 124 40196	220UF20%	16V
2813	4822 124 21913	1UF20%	63V
2814	4822 126 13692	47PF 1% NP0	63V
2815	4822 126 14585	100NF 10%	50V
2816	5322 122 32654	22NF10%X7R	63V
2817	4822 124 21913	1UF20%	63V
2818	5322 122 32654	22NF10%X7R	63V
2821	5322 122 32654	22NF10%X7R	63V
2822	5322 122 32654	22NF10%X7R	63V
2831	5322 122 32531	100PF 5%NP0	50V
2832	4822 126 14585	100NF 10%	50V
2833	5322 122 32654	22NF10%X7R	63V
2834	5322 122 32531	100PF 5%NP0	50V

CAPACITORS

2835	5322 122 32531	100PF 5%NP0	50V
2836	5322 122 32531	100PF 5%NP0	50V
2837	5322 122 32531	100PF 5%NP0	50V
2851	5322 122 32658	22PF 5%	50V
2852	5322 122 32658	22PF 5%	50V
2853	4822 124 81151	22UF	50V
2854	4822 124 81151	22UF	50V
2855	5322 122 32531	100PF 5%NP0	50V
2856	5322 122 32531	100PF 5%NP0	50V
2857	4822 126 14585	100NF 10%	50V
2858	4822 124 41751	47UF 20%	50V
2860	4822 124 41751	47UF 20%	50V
2861	5322 122 32654	22NF10%X7R	63V
2862	5322 122 32531	100PF 5%NP0	50V
2863	5322 122 32531	100PF 5%NP0	50V
2864	5322 122 32531	100PF 5%NP0	50V
2865	5322 122 32531	100PF 5%NP0	50V
2866	5322 122 32531	100PF 5%NP0	50V
2867	5322 122 32531	100PF 5%NP0	50V
2868	4822 122 33575	220PF 5% NP0	63V
2869	4822 122 33575	220PF 5% NP0	63V
2871	4822 122 33177	10NF 20% X7R	50V
2872	4822 122 33177	10NF 20% X7R	50V
2873	4822 122 33177	10NF 20% X7R	50V
2875	4822 122 33177	10NF 20% X7R	50V
2876	4822 122 33177	10NF 20% X7R	50V
2877	5322 121 42386	100NF 5%	63V
2878	5322 121 42386	100NF 5%	63V
2879	5322 121 42386	100NF 5%	63V
2880	5322 121 42386	100NF 5%	63V
2881	5322 121 42386	100NF 5%	63V
2882	5322 121 42386	100NF 5%	63V
2883	5322 126 10511	1NF 5%NP0	50V
2884	5322 126 10511	1NF 5%NP0	50V
2885	5322 126 10511	1NF 5%NP0	50V
2886	5322 126 10511	1NF 5%NP0	50V
2887	4822 122 33127	2,2NF10%X7R	63V
2888	4822 122 33127	2,2NF10%X7R	63V
2901	4822 124 81151	22UF	50V
2902	4822 124 40248	10UF20%	63V
2904	4822 126 13751	47NF10% X7R	63V
2905	4822 124 40248	10UF20%	63V
2906	5322 122 32268	470PF 10%	50V
2908	4822 126 13473	220NF80-20%	50V
2909	5322 126 10223	4,7NF10%X7R	63V
2910	4822 122 33575	220PF 5% NP0	63V
2911	5322 122 32654	22NF10%X7R	63V
2912	4822 124 41584	100UF 20%	10V
2913	4822 124 40248	10UF20%	63V
2914	5322 122 32268	470PF 10%	50V
2916	4822 126 13473	220NF80-20%	50V
2917	5322 126 10223	4,7NF10%X7R	63V
2918	4822 122 33575	220PF 5% NP0	63V
2919	4822 124 41584	100UF 20%	10V
2920	4822 126 13473	220NF80-20%	50V
2921	4822 126 13473	220NF80-20%	50V
2923	4822 124 81151	22UF	50V

ELECTRICAL PARTSLIST - MONO2 BOARD

CAPACITORS

2924	4822 124 40248	10UF20%	63V
2925	4822 124 40181	220UF20%	10V
2926	4822 126 14585	100NF 10%	50V
2930	5322 122 32531	100PF 5%NP0	50V
2931	5322 122 32531	100PF 5%NP0	50V
2932	5322 122 32531	100PF 5%NP0	50V
2933	5322 122 32531	100PF 5%NP0	50V
2934	5322 126 10511	1NF 5%NP0	50V
2937	4822 122 33575	220PF 5% NP0	63V

RESISTORS

3251		4822 051 20471	470R00	5%	0,1W
3252		4822 117 10837	100K	1%	0.1W
3253		4822 117 10837	100K	1%	0.1W
3254	▲	4822 117 11342	0R33	5%	2W
3256		4822 117 10833	10K	1%	0,1W
3257	▲	4822 117 11342	0R33	5%	2W
3258		4822 117 11149	82K	1%	0,1W
3259		4822 117 10361	680R	1%	0,1W
3260		4822 117 10834	47K	1%	0,1W
3261		4822 116 83881	390R	5%	0,5W
3262		4822 050 21003	10K00	1%	0,6W
3263		4822 117 10361	680R	1%	0,1W
3264		4822 117 10837	100K	1%	0.1W
3266		4822 051 20223	22K00	5%	0,1W
3267		4822 051 20392	3K90	5%	0,1W
3268		4822 051 20332	3K30	5%	0,1W
3269		4822 051 20332	3K30	5%	0,1W
3270	▲	4822 052 10479	47R00	5%	0,33W
3271	▲	4822 052 10479	47R00	5%	0,33W
3272		4822 051 20393	39K00	5%	0,1W
3273		4822 116 83872	220R	5%	0,5W
3274		4822 116 83876	270R	5%	0,5W
3275		4822 117 10353	150R	1%	0,1W
3276		4822 116 52234	100K	5%	0,5W
3291	▲	4822 052 10109	10R00	5%	0,33W
3292		4822 116 83933	15K	1%	0,1W
3293		4822 117 10833	10K	1%	0,1W
3294		4822 117 10833	10K	1%	0,1W
3295		4822 116 83933	15K	1%	0,1W
3301	▲	4822 052 10479	47R00	5%	0,33W
3302	▲	4822 117 11151	1R	5%	
3304		4822 117 11148	56K	1%	0,1W
3305		4822 117 10834	47K	1%	0,1W
3306		4822 117 10834	47K	1%	0,1W
3307		4822 117 10834	47K	1%	0,1W
3308		4822 117 11148	56K	1%	0,1W
3309		4822 050 24708	4R70	1%	0,6W
3310		4822 051 20182	1K80	5%	0,1W
3311		4822 050 24708	4R70	1%	0,6W
3314		4822 117 11148	56K	1%	0,1W
3315		4822 051 20182	1K80	5%	0,1W
3316		4822 050 24708	4R70	1%	0,6W
3319		4822 117 11148	56K	1%	0,1W
3322		4822 117 11148	56K	1%	0,1W
3323		4822 051 20182	1K80	5%	0,1W
3324		4822 117 11148	56K	1%	0,1W
3326		4822 051 20333	33K00	5%	0,1W

RESISTORS

3327		4822 117 11503	220R	1%	0.1W
3328	▲	4822 052 10479	47R00	5%	0,33W
3329		4822 117 10837	100K	1%	0.1W
3330		4822 117 10833	10K	1%	0,1W
3334		4822 051 10102	1K00	2%	0,25W
3335		4822 051 10102	1K00	2%	0,25W
3336		4822 051 10102	1K00	2%	0,25W
3337	▲	4822 117 11744	0R22	5%	1W
3338	▲	4822 117 11744	0R22	5%	1W
3339		4822 117 11139	1K5	1%	0,1W
3340		4822 117 11139	1K5	1%	0,1W
3341	▲	4822 117 11744	0R22	5%	1W
3342	▲	4822 117 11744	0R22	5%	1W
3343		4822 117 11139	1K5	1%	0,1W
3344	▲	4822 117 11744	0R22	5%	1W
3345	▲	4822 117 11744	0R22	5%	1W
3352	▲	4822 053 10478	4R70	5%	1W
3353	▲	4822 053 10478	4R70	5%	1W
3354	▲	4822 053 10478	4R70	5%	1W
3356		4822 117 10834	47K	1%	0,1W
3357		4822 050 21003	10K00	1%	0,6W
3358		4822 051 10102	1K00	2%	0,25W
3359		4822 117 10837	100K	1%	0.1W
3360		4822 117 10833	10K	1%	0,1W
3361		4822 051 20471	470R00	5%	0,1W ✓
3362		4822 051 20471	470R00	5%	0,1W ✓
3363		4822 051 20471	470R00	5%	0,1W ✓
3501		4822 116 83933	15K	1%	0,1W
3502		4822 116 83933	15K	1%	0,1W
3505		4822 116 52244	15K	5%	0,5W
3506		4822 116 52244	15K	5%	0,5W
3509		4822 116 83933	15K	1%	0,1W
3510		4822 116 83933	15K	1%	0,1W
3511		4822 051 20101	100R00	5%	0,1W ✓
3512		4822 051 20101	100R00	5%	0,1W ✓
3513		4822 117 10834	47K	1%	0,1W
3514		4822 117 10834	47K	1%	0,1W
3515		4822 051 20471	470R00	5%	0,1W ✓
3516		4822 051 20471	470R00	5%	0,1W ✓
3517		4822 051 20393	39K00	5%	0,1W
3518		4822 051 20393	39K00	5%	0,1W
3519		4822 051 20822	8K20	5%	0,1W
3520		4822 051 20822	8K20	5%	0,1W
3521		4822 051 20393	39K00	5%	0,1W
3522		4822 051 20393	39K00	5%	0,1W
3523		4822 051 20822	8K20	5%	0,1W
3524		4822 051 20822	8K20	5%	0,1W
3525		4822 051 20393	39K00	5%	0,1W
3526		4822 051 20393	39K00	5%	0,1W
3527		4822 051 20822	8K20	5%	0,1W
3528		4822 051 20822	8K20	5%	0,1W
3529		4822 051 20471	470R00	5%	0,1W ✓
3530		4822 051 20471	470R00	5%	0,1W ✓
3531		4822 051 20393	39K00	5%	0,1W
3532		4822 051 20393	39K00	5%	0,1W
3533		4822 051 20822	8K20	5%	0,1W
3534		4822 051 20822	8K20	5%	0,1W

ELECTRICAL PARTSLIST - MONO2 BOARD

RESISTORS

3537	4822 051 20393	39K00	5%	0,1W	
3538	4822 051 20393	39K00	5%	0,1W	
3539	4822 051 20822	8K20	5%	0,1W	
3540	4822 051 20822	8K20	5%	0,1W	
3541	4822 051 20393	39K00	5%	0,1W	
3542	4822 051 20393	39K00	5%	0,1W	
3543	4822 117 12955	2K7	1%	0,1W	0805
3544	4822 117 12955	2K7	1%	0,1W	0805
3545	4822 117 10833	10K	1%	0,1W	
3546	4822 117 10833	10K	1%	0,1W	
3551	4822 117 11504	270R	1%	0.1W	
3552	4822 117 11504	270R	1%	0.1W	
3553	4822 117 11504	270R	1%	0.1W	
3554	4822 117 11504	270R	1%	0.1W	
3555	4822 051 20332	3K30	5%	0,1W	
3556	4822 117 11504	270R	1%	0.1W	
3557	4822 117 11504	270R	1%	0.1W	
3560	4822 051 10102	1K00	2%	0,25W	
3561 ▲	4822 052 10478	4R70	5%	0,33W	
3562	4822 051 20471	470R00	5%	0,1W	
3563	4822 051 10102	1K00	2%	0,25W	
3566	4822 116 83876	270R	5%	0,5W	
3567	4822 116 83876	270R	5%	0,5W	
3571	4822 051 20334	330K00	5%	0,1W	
3572	4822 051 20334	330K00	5%	0,1W	
3573	4822 051 10102	1K00	2%	0,25W	
3574	4822 051 10102	1K00	2%	0,25W	
3575	4822 117 11148	56K	1%	0,1W	
3576	4822 117 11148	56K	1%	0,1W	
3577	4822 051 20561	560R00	5%	0,1W	
3578	4822 051 20561	560R00	5%	0,1W	
3579	4822 051 20394	390K00	5%	0,1W	
3580	4822 051 20394	390K00	5%	0,1W	
3581	4822 051 20273	27K00	5%	0,1W	
3582	4822 051 20273	27K00	5%	0,1W	
3583	4822 050 21003	10K00	1%	0,6W	
3584	4822 050 21003	10K00	1%	0,6W	
3585	4822 117 11139	1K5	1%	0,1W	
3586	4822 117 11139	1K5	1%	0,1W	
3587	4822 051 20392	3K90	5%	0,1W	
3588	4822 116 52276	3K9	5%	0,5W	
3589	4822 117 10833	10K	1%	0,1W	
3590	4822 117 10833	10K	1%	0,1W	
3591	4822 117 10837	100K	1%	0.1W	
3592	4822 117 10837	100K	1%	0.1W	
3593	4822 051 20472	4K70	5%	0,1W	
3594	4822 051 20472	4K70	5%	0,1W	
3595	4822 051 20472	4K70	5%	0,1W	
3596	4822 051 20472	4K70	5%	0,1W	
3601	4822 051 20101	100R00	5%	0,1W	
3602	4822 051 20101	100R00	5%	0,1W	
3603	4822 117 10837	100K	1%	0.1W	
3604	4822 117 10837	100K	1%	0.1W	
3605	4822 117 11383	12K	1%	0,1W	
3606	4822 117 11383	12K	1%	0,1W	
3607	4822 051 20333	33K00	5%	0,1W	
3608	4822 051 20333	33K00	5%	0,1W	

RESISTORS

3609	4822 051 20121	120R00	5%	0,1W	
3610	4822 051 20121	120R00	5%	0,1W	
3611	4822 117 10834	47K	1%	0,1W	
3612	4822 117 10834	47K	1%	0,1W	
3613	4822 051 20471	470R00	5%	0,1W	
3614	4822 051 20471	470R00	5%	0,1W	
3615	4822 051 20471	470R00	5%	0,1W	
3616	4822 051 20471	470R00	5%	0,1W	
3618	4822 117 10834	47K	1%	0,1W	
3619	4822 117 10834	47K	1%	0,1W	
3620	4822 116 52175	100E	5%	0,5W	
3621	4822 051 20101	100R00	5%	0,1W	
3622	4822 051 20121	120R00	5%	0,1W	
3623	4822 051 20121	120R00	5%	0,1W	
3627 ▲	4822 052 10109	10R00	5%	0,33W	
3629 ▲	4822 052 10109	10R00	5%	0,33W	
3630	4822 050 11002	1K00	1%	0,4W	
3631	4822 050 11002	1K00	1%	0,4W	
3632	4822 050 11002	1K00	1%	0,4W	
3633	4822 051 10102	1K00	2%	0,25W	
3634	4822 051 10102	1K00	2%	0,25W	
3635	4822 051 10102	1K00	2%	0,25W	
3636	4822 051 20471	470R00	5%	0,1W	
3637	4822 051 20471	470R00	5%	0,1W	
3641	4822 117 10837	100K	1%	0.1W	
3642	4822 117 10837	100K	1%	0.1W	
3643	4822 117 10837	100K	1%	0.1W	
3644	4822 117 10837	100K	1%	0.1W	
3645	4822 117 11148	56K	1%	0,1W	
3646	4822 117 11148	56K	1%	0,1W	
3649	4822 117 10837	100K	1%	0.1W	
3650	4822 117 10837	100K	1%	0.1W	
3651	4822 117 11148	56K	1%	0,1W	
3652	4822 117 11148	56K	1%	0,1W	
3655	4822 117 10837	100K	1%	0.1W	
3656	4822 117 10837	100K	1%	0.1W	
3657	4822 117 11148	56K	1%	0,1W	
3658	4822 117 11148	56K	1%	0,1W	
3659	4822 117 12955	2K7	1%	0,1W	0805
3660	4822 117 12955	2K7	1%	0,1W	0805
3661	4822 051 20562	5K6	5%	0,1W	0805
3662	4822 051 20562	5K6	5%	0,1W	0805
3663	4822 117 12955	2K7	1%	0,1W	0805
3664	4822 117 12955	2K7	1%	0,1W	0805
3665	4822 051 20562	5K6	5%	0,1W	0805
3666	4822 051 20562	5K6	5%	0,1W	0805
3667	4822 117 12955	2K7	1%	0,1W	0805
3668	4822 117 12955	2K7	1%	0,1W	0805
3669	4822 051 20562	5K6	5%	0,1W	0805
3670	4822 051 20562	5K6	5%	0,1W	0805
3671	4822 117 10834	47K	1%	0,1W	
3672	4822 117 10834	47K	1%	0,1W	
3673	4822 117 11449	2K2	5%	0,1W	0805
3674	4822 117 11449	2K2	5%	0,1W	0805
3675	4822 051 20101	100R00	5%	0,1W	
3676	4822 051 20101	100R00	5%	0,1W	
3677	4822 117 10834	47K	1%	0,1W	

ELECTRICAL PARTSLIST - MONO2 BOARD

RESISTORS				
3678	4822 117 10834	47K	1%	0,1W
3679	4822 117 11449	2K2	5%	0,1W 0805
3680	4822 117 11449	2K2	5%	0,1W 0805
3681	4822 051 20101	100R00	5%	0,1W
3682	4822 051 20101	100R00	5%	0,1W
3683	4822 117 10834	47K	1%	0,1W
3684	4822 117 10834	47K	1%	0,1W
3685	4822 117 11449	2K2	5%	0,1W 0805
3686	4822 117 11449	2K2	5%	0,1W 0805
3687	4822 051 20101	100R00	5%	0,1W
3688	4822 051 20101	100R00	5%	0,1W
3689	4822 117 11449	2K2	5%	0,1W 0805
3690	4822 117 11449	2K2	5%	0,1W 0805
3691	4822 116 52256	2K2	5%	0,5W
3692	4822 117 11449	2K2	5%	0,1W 0805
3693	4822 117 11449	2K2	5%	0,1W 0805
3694	4822 116 52256	2K2	5%	0,5W
3695	4822 117 13579	220K	1%	0.1W
3696	4822 117 10833	10K	1%	0,1W
3697	4822 116 52257	22K	5%	0,5W
3698	4822 117 13579	220K	1%	0.1W
3699	4822 117 10833	10K	1%	0,1W
3700	4822 051 20223	22K00	5%	0,1W
3801	4822 117 12521	68R	1%	0,1W
3802	4822 117 12521	68R	1%	0,1W
3803	4822 117 12521	68R	1%	0,1W
3804	4822 117 12521	68R	1%	0,1W
3805	4822 051 10102	1K00	2%	0,25W
3806	4822 051 10102	1K00	2%	0,25W
3809	4822 051 20109	10R00	5%	0,1W
3810	4822 117 11449	2K2	5%	0,1W 0805
3811	4822 051 20109	10R00	5%	0,1W
3812	4822 051 20471	470R00	5%	0,1W
3813	4822 051 20121	120R00	5%	0,1W
3814	4822 051 20109	10R00	5%	0,1W
3815	4822 117 12521	68R	1%	0,1W
3816	4822 117 12521	68R	1%	0,1W
3817	4822 117 11504	270R	1%	0.1W
3818	4822 117 11503	220R	1%	0.1W
3820	4822 053 10101	100R00	5%	1W
3821	4822 053 10101	100R00	5%	1W
3831	4822 051 20101	100R00	5%	0,1W
3832	4822 051 20479	47R00	5%	0,1W
3834	4822 051 20101	100R00	5%	0,1W
3851	4822 051 20332	3K30	5%	0,1W
3852	4822 051 20273	27K00	5%	0,1W
3853	4822 117 10833	10K	1%	0,1W
3854	4822 051 20472	4K70	5%	0,1W
3855	4822 116 83876	270R	5%	0,5W
3856	4822 117 11504	270R	1%	0.1W
3857	4822 117 10837	100K	1%	0.1W
3858	4822 117 10837	100K	1%	0.1W
3859	4822 117 10833	10K	1%	0,1W
3860	4822 117 10833	10K	1%	0,1W
3871	4822 051 20332	3K30	5%	0,1W
3872	4822 051 20332	3K30	5%	0,1W
3873	4822 051 10102	1K00	2%	0,25W

RESISTORS				
3874	4822 051 10102	1K00	2%	0,25W
3875	4822 051 20332	3K30	5%	0,1W
3877	4822 051 10102	1K00	2%	0,25W
3878	4822 051 10102	1K00	2%	0,25W
3879	4822 051 20332	3K30	5%	0,1W
3880	4822 051 20332	3K30	5%	0,1W
3881	4822 051 10102	1K00	2%	0,25W
3882	4822 051 10102	1K00	2%	0,25W
3883	4822 117 11383	12K	1%	0,1W
3884	4822 117 11383	12K	1%	0,1W
3885	4822 117 11383	12K	1%	0,1W
3886	4822 117 11383	12K	1%	0,1W
3887	4822 117 11383	12K	1%	0,1W
3888	4822 117 11383	12K	1%	0,1W
3889	4822 117 11449	2K2	5%	0,1W 0805
3890	4822 117 11449	2K2	5%	0,1W 0805
3891	4822 051 20822	8K20	5%	0,1W
3892	4822 051 20822	8K20	5%	0,1W
3893	4822 051 20822	8K20	5%	0,1W
3895	4822 051 20822	8K20	5%	0,1W
3896	4822 051 20822	8K20	5%	0,1W
3901 ▲	4822 052 10479	47R00	5%	0,33W
3902	4822 117 11148	56K	1%	0,1W
3903	4822 117 10834	47K	1%	0,1W
3904	4822 116 83884	47K	5%	0,5W
3905	4822 050 24708	4R70	1%	0,6W
3906	4822 117 11148	56K	1%	0,1W
3908	4822 051 20182	1K80	5%	0,1W
3910	4822 050 24708	4R70	1%	0,6W
3911	4822 117 11148	56K	1%	0,1W
3913	4822 051 20182	1K80	5%	0,1W
3914	4822 117 11148	56K	1%	0,1W
3915 ▲	4822 052 10479	47R00	5%	0,33W
3916 ▲	4822 053 10478	4R70	5%	1W
3917	4822 051 20333	33K00	5%	0,1W
3918	4822 117 11503	220R	1%	0.1W
3919 ▲	4822 053 10478	4R70	5%	1W
3920	4822 117 10837	100K	1%	0.1W
3921	4822 051 10102	1K00	2%	0,25W
3922	4822 051 10102	1K00	2%	0,25W
3925	4822 117 10833	10K	1%	0,1W
3926 ▲	4822 117 11744	0R22	5%	1W
3927 ▲	4822 117 11744	0R22	5%	1W
3928	4822 117 11139	1K5	1%	0,1W
3929	4822 117 11139	1K5	1%	0,1W
3930 ▲	4822 117 11744	0R22	5%	1W
3931 ▲	4822 117 11744	0R22	5%	1W
3935	4822 051 10102	1K00	2%	0,25W
3936	4822 117 10837	100K	1%	0.1W
3937	4822 117 10833	10K	1%	0,1W
3938	4822 117 11449	2K2	5%	0,1W 0805
3939	4822 117 11449	2K2	5%	0,1W 0805
3940	4822 117 11503	220R	1%	0.1W
3941	4822 117 11503	220R	1%	0.1W
3943	4822 117 10833	10K	1%	0,1W
3944	4822 117 11503	220R	1%	0.1W
3945	4822 117 11503	220R	1%	0.1W

ELECTRICAL PARTSLIST - MONO2 BOARD

RESISTORS

3946	4822 051 20471	470R00 5% 0,1W
3947	4822 051 20471	470R00 5% 0,1W
3948	4822 117 11503	220R 1% 0.1W
3949	4822 117 11503	220R 1% 0.1W
3950	4822 051 20182	1K80 5% 0,1W
3951	4822 051 20182	1K80 5% 0,1W
3952	4822 051 20101	100R00 5% 0,1W
3953	4822 051 20101	100R00 5% 0,1W
3954	4822 051 20101	100R00 5% 0,1W
3955	4822 051 20101	100R00 5% 0,1W
4251	4822 051 20008	0R00 JUMP. (0805)
4252	4822 051 20008	0R00 JUMP. (0805)
4256	4822 051 20008	0R00 JUMP. (0805)
4258	4822 051 20008	0R00 JUMP. (0805)
4259	4822 051 20008	0R00 JUMP. (0805)
4260	4822 051 20008	0R00 JUMP. (0805)
4283	4822 051 20008	0R00 JUMP. (0805)
4284	4822 051 20008	0R00 JUMP. (0805)
4285	4822 051 20008	0R00 JUMP. (0805)
4287	4822 051 20008	0R00 JUMP. (0805)
4320	4822 051 20008	0R00 JUMP. (0805)
4506	4822 051 20008	0R00 JUMP. (0805)
4513	4822 051 20008	0R00 JUMP. (0805)
4514	4822 051 20008	0R00 JUMP. (0805)
4515	4822 051 20008	0R00 JUMP. (0805)
4516	4822 051 20008	0R00 JUMP. (0805)
4517	4822 051 20008	0R00 JUMP. (0805)
4518	4822 051 20008	0R00 JUMP. (0805)
4519	4822 051 20008	0R00 JUMP. (0805)
4520	4822 051 20008	0R00 JUMP. (0805)
4521	4822 051 20008	0R00 JUMP. (0805)
4522	4822 051 20008	0R00 JUMP. (0805)
4523	4822 051 20008	0R00 JUMP. (0805)
4524	4822 051 20008	0R00 JUMP. (0805)
4526	4822 051 20008	0R00 JUMP. (0805)
4528	4822 051 20008	0R00 JUMP. (0805)
4529	4822 051 20008	0R00 JUMP. (0805)
4530	4822 051 20008	0R00 JUMP. (0805)
4531	4822 051 20008	0R00 JUMP. (0805)
4532	4822 051 20008	0R00 JUMP. (0805)
4533	4822 051 20008	0R00 JUMP. (0805)
4537	4822 051 20008	0R00 JUMP. (0805)
4538	4822 051 20008	0R00 JUMP. (0805)
4539	4822 051 20008	0R00 JUMP. (0805)
4540	4822 051 20008	0R00 JUMP. (0805)
4541	4822 051 20008	0R00 JUMP. (0805)
4542	4822 051 20008	0R00 JUMP. (0805)
4543	4822 051 20008	0R00 JUMP. (0805)
4544	4822 051 20008	0R00 JUMP. (0805)
4545	4822 051 20008	0R00 JUMP. (0805)
4548	4822 051 20008	0R00 JUMP. (0805)
4550	4822 051 20008	0R00 JUMP. (0805)
4551	4822 051 20008	0R00 JUMP. (0805)
4552	4822 051 20008	0R00 JUMP. (0805)
4553	4822 051 20008	0R00 JUMP. (0805)
4555	4822 051 20008	0R00 JUMP. (0805)
4556	4822 051 20008	0R00 JUMP. (0805)
4557	4822 051 20008	0R00 JUMP. (0805)
4558	4822 051 20008	0R00 JUMP. (0805)
4559	4822 051 20008	0R00 JUMP. (0805)
4560	4822 051 20008	0R00 JUMP. (0805)
4564	4822 051 20008	0R00 JUMP. (0805)
4565	4822 051 20008	0R00 JUMP. (0805)
4566	4822 051 20008	0R00 JUMP. (0805)
4642	4822 051 20008	0R00 JUMP. (0805)
4644	4822 051 20008	0R00 JUMP. (0805)
4651	4822 051 20008	0R00 JUMP. (0805)
4652	4822 051 20008	0R00 JUMP. (0805)
4653	4822 051 20008	0R00 JUMP. (0805)
4832	4822 051 20008	0R00 JUMP. (0805)
4835	4822 051 20008	0R00 JUMP. (0805)
4902	4822 051 20008	0R00 JUMP. (0805)
4903	4822 051 20008	0R00 JUMP. (0805)
4904	4822 051 20008	0R00 JUMP. (0805)
4905	4822 051 20008	0R00 JUMP. (0805)
4908	4822 051 20008	0R00 JUMP. (0805)
4909	4822 051 20008	0R00 JUMP. (0805)
4910	4822 051 20008	0R00 JUMP. (0805)
4917	4822 051 20008	0R00 JUMP. (0805)
4918	4822 051 20008	0R00 JUMP. (0805)
4920	4822 051 20008	0R00 JUMP. (0805)
4921	4822 051 20008	0R00 JUMP. (0805)
4922	4822 051 20008	0R00 JUMP. (0805)
4923	4822 051 20008	0R00 JUMP. (0805)
4924	4822 051 20008	0R00 JUMP. (0805)
4925	4822 051 20008	0R00 JUMP. (0805)

FILTERS

5302	4822 157 62255	COIL
5304	4822 157 62255	COIL
5306	4822 157 62255	COIL
5901	4822 157 62255	COIL
5902	4822 157 62255	COIL

DIODES

6251	4822 130 82078	D5SBA20
6255	4822 130 30621	1N4148
6256	4822 130 30621	1N4148
6257	4822 130 31878	1N4003G
6258	4822 130 31878	1N4003G
6259	4822 130 31878	1N4003G
6260	4822 209 33575	L7812CP
6261	4822 130 31878	1N4003G
6262	4822 130 31878	1N4003G
6263	4822 130 31878	1N4003G
6264	4822 130 34173	BZX79-B5V6
6266	4822 130 34281	BZX79-B15
6267	4822 209 31841	L7805CP
6268	4822 130 31878	1N4003G
6270	4822 130 34278	BZX79-B6V8
6271	4822 130 30621	1N4148
6274	4822 130 31878	1N4003G
6275	4822 130 31878	1N4003G
6276	4822 130 34173	BZX79-B5V6
6279	4822 130 30621	1N4148
6280	4822 130 61219	BZX79-B10

ELECTRICAL PARTSLIST - MONO2 BOARD

DIODES

6281	4822 130 34441	BZX79-B22
6289	4822 130 83757	BAS216
6290	4822 130 83757	BAS216
6304	4822 130 11411	BZX284-C3V3
6305	4822 130 83757	BAS216
6501	4822 130 30621	1N4148
6601	4822 130 30621	1N4148
6602	4822 130 30621	1N4148
6641	4822 130 83757	BAS216
6642	4822 130 30621	1N4148
6643	4822 130 30621	1N4148
6644	4822 130 30621	1N4148
6645	4822 130 30621	1N4148
6646	4822 130 83757	BAS216
6647	4822 130 83757	BAS216
6648	4822 130 83757	BAS216
6649	4822 130 31878	1N4003G
6650 ▲	4822 130 61219	BZX79-B10
6801	4822 130 34278	BZX79-B6V8
6802	4822 130 34278	BZX79-B6V8
6803	4822 130 34278	BZX79-B6V8
6804	4822 130 34278	BZX79-B6V8
6805	4822 130 34278	BZX79-B6V8
6806	4822 130 34278	BZX79-B6V8
6807	4822 130 34278	BZX79-B6V8
6808	4822 130 34278	BZX79-B6V8
6809	4822 130 30621	1N4148
6810	4822 130 34233	BZX79-B5V1
6811	4822 130 34382	BZX79-B8V2
6831	4822 130 30621	1N4148
6832	4822 130 30621	1N4148

TRANSISTORS

7251	9322 139 22687	BD242BFP
7252	4822 130 60511	BC847B
7253	4822 130 60511	BC847B
7254	4822 130 60511	BC847B
7255	4822 130 60373	BC856B
7256	4822 130 60511	BC847B
7257	4822 130 41246	BC327-25
7258	4822 130 41246	BC327-25
7259	4822 130 60511	BC847B
7260	4822 130 60511	BC847B
7261	4822 130 60373	BC856B
7301	4822 209 17447	STK496-270
7304	4822 130 60511	BC847B
7305	4822 130 60511	BC847B
7306	4822 130 60511	BC847B
7307	4822 130 60511	BC847B
7309	4822 130 60373	BC856B
7310	4822 130 60511	BC847B
7501	4822 209 72748	LC7821
7503	4822 209 83357	NJM4560M
7504	4822 209 83357	NJM4560M
7571	4822 209 70157	NJM4560DD
7572	4822 209 72748	LC7821
7601	4822 209 31378	NJM4556MB
7621	4822 130 42615	BC817-40
7622	4822 130 42615	BC817-40
7641	4822 209 17386	TDA7437T
7642	4822 209 17386	TDA7437T
7643	4822 209 17386	TDA7437T
7644	4822 130 40855	BC337
7651	4822 130 42615	BC817-40
7652	4822 130 42615	BC817-40
7653	4822 130 42615	BC817-40
7654	4822 130 42615	BC817-40
7655	4822 130 42615	BC817-40
7656	4822 130 42615	BC817-40
7657	4822 130 60373	BC856B
7658	4822 130 60373	BC856B
7660	4822 209 83357	NJM4560M
7661	4822 130 42615	BC817-40
7662	4822 130 42615	BC817-40
7801	4822 130 60511	BC847B
7802 ▲	4822 130 44568	BC557B
7803	4822 209 16886	STV6401
7901	4822 209 17385	STK496-070
7902	4822 130 60511	BC847B
7903	4822 130 60511	BC847B
7904	4822 130 60511	BC847B
7908	4822 130 60373	BC856B
7909	4822 130 60511	BC847B
7910	9322 139 22687	BD242BFP